

DIESEL ENGINES • DUAL FUEL ENGINES • NATURAL GAS ENGINES • GAS TURBINES

# DIESEL PROGRESS

INCORPORATING  
GAS TURBINE  
PROGRESS



FIVE DOLLARS PER YEAR

AUGUST, 1959

FIFTY CENTS PER COPY

*Increased power, lower fuel consumption*

# THREE NEW GENERAL MOTORS 567 DIESEL ENGINES

New "D" series available in turbo-charged or normally aspirated models

First application for the new "D" engines was announced recently by Electro-Motive for a new and more powerful, more economical line of Diesel locomotives. Four years in development, two of the new engines are turbo-charged, one normally aspirated.

A long list of improvements have been incorporated to give these engines even more stamina, reliability and lower maintenance requirements than their famous long-lived predecessor, the General Motors 567C engine.

## Normally aspirated series

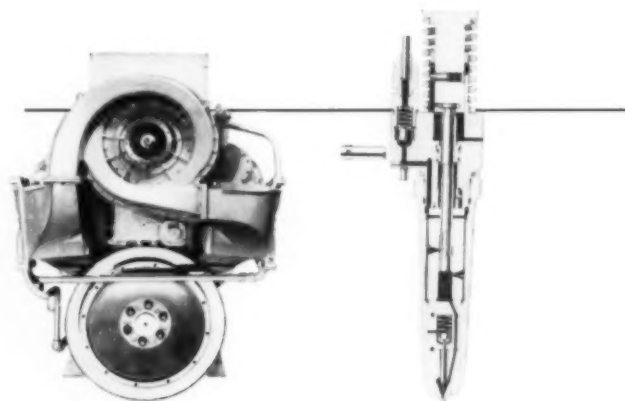
The same fundamental design is used for each engine whether normally aspirated or turbo-charged. As a result, the normally aspirated 567D-1 engine, made to turbo-charged standards, is an engine of outstanding durability and low maintenance. An increase in compression ratio from 16:1 to 20:1 and a new needle-valve injector provide for increased power and fuel economy. Specific fuel consumption at full load is 5 percent less than the previous "C" engine.

## Turbo-charged series

The Electro-Motive designed turbo-charger, unlike conventional super-chargers, operates efficiently at low and high engine speeds. This feature is especially important for starting, low load and acceleration. The turbo-charged 567D-2 and 3 engines will not derate over a wide range of altitudes. Under test in actual locomotive service conditions, full engine output was maintained at over 8,000 feet altitude. In addition, the turbo-

charged engines reduce specific fuel consumption by as much as 10 percent at full load.

Continual improvement of major components has long been an Electro-Motive policy. These new engines represent more than twenty years of Diesel engine development. They are the finest expression yet of the General Motors 567 series—more powerful, more economical and even more reliable.

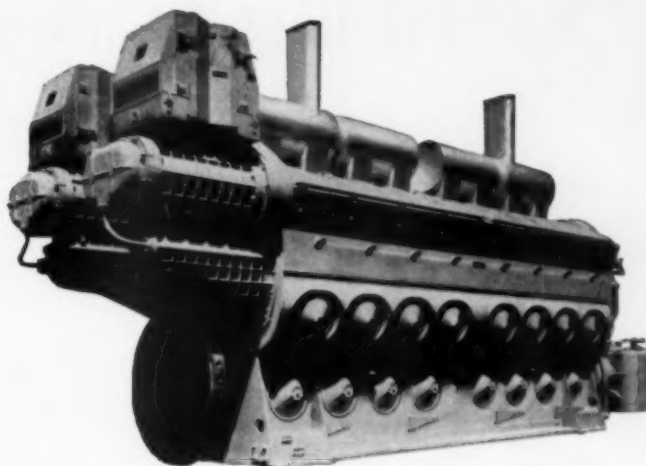


New turbo-charger is Electro-Motive designed and developed. Unit operates from engine gear train at low engine speeds, from exhaust turbine at high speeds. Combination drive provides adequate air supply at all operating levels. Turbo-charger maintains engine output in high altitude operation.

New needle-valve injector gives better fuel atomization and eliminates after dribble, both factors to improve specific fuel consumption. Electro-Motive developed, the new injector is standard on all 567D engines. It is also applicable to earlier General Motors 567 series engines and present spherical valve type injectors can be converted to the new type.

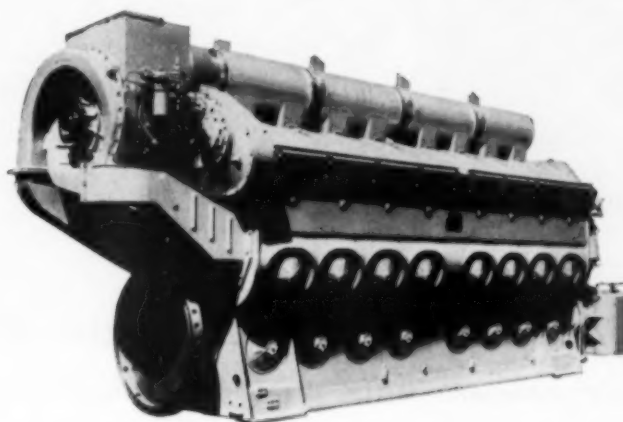
### **567D-1 Normally Aspirated**

1800 tractive horsepower. 20:1 compression ratio. 16-cylinders. First used in the General Motors GP-18 and SD-18 locomotives. 12-cylinder version is used in the new General Motors RS-1325 locomotive.



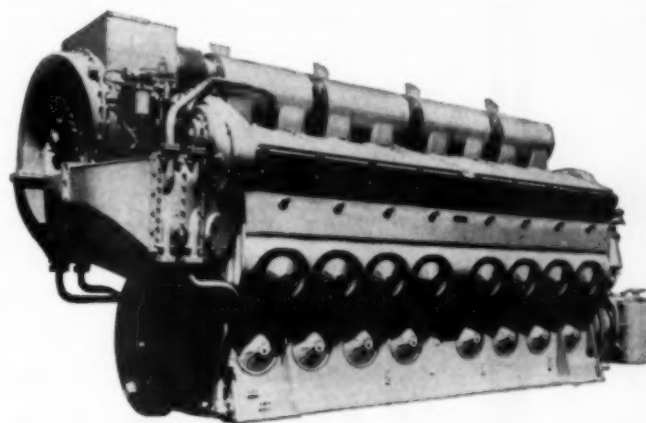
### **567D-2 Turbo-charged**

2000 tractive horsepower.  $14\frac{1}{2}$ :1 compression ratio. 16-cylinders. First used in the General Motors GP-20 locomotive.



### **567D-3 Turbo-charged**

2400 tractive horsepower.  $14\frac{1}{2}$ :1 compression ratio. 16-cylinders. First used in the General Motors SD-24 locomotive and MU-60 peaking plant.



## **ELECTRO-MOTIVE DIVISION • GENERAL MOTORS**

**La Grange, Illinois** HOME OF THE DIESEL LOCOMOTIVE

**In Canada:** General Motors Diesel Limited, London, Ontario





**GM HEAT EXCHANGERS COOL ONE OF AMERICA'S LARGEST LUXURY YACHTS—  
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—Top-Quality Products  
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search and Engineering.



Harrison keeps temperatures shipshape on the *Seven Seas*. The engine oil for the two powerful GM Diesels aboard this fabulous 90-foot pleasure cruiser is cooled by Harrison. From full power to leisurely cruising, heat's never a problem. Harrison heat exchangers are backed by General Motors' engineering and research, and more than 48 years' experience in the manufacture of top-quality heat-control products. That's why Harrison heat exchangers are specified on all types of the finest Diesel equipment—marine, industrial and automotive. If you have a cooling problem, look to Harrison for the answer.



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HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK



# DIESEL PROGRESS

INCORPORATING  
GAS TURBINE  
PROGRESS

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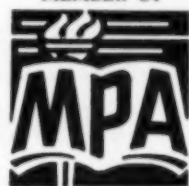


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## CONTENTS FOR AUGUST, 1959

Heavy Fuel Cuts Cost at St. Cloud .....	17
Midwest Towing Adds M/V <i>Badger</i> .....	21
Timken Converts to Diesels and Saves .....	22
Compact Brushless AC Generators for Engine Drive 10-150 KW .....	24
Functional Rig Handles Deep Drilling .....	26
Excavating Canal 19 .....	28
Diesel Fleet for Submarine Pipeliner .....	30
Chrysler Will Market Deutz Air-Cooled Diesels .....	32
Unique Test Facilities Speed Turbocharger Development .....	35
Diesel Dump Trucks Work Around the World .....	36
Ford Diesels Have Wide Application .....	38
Asphalt Tanker <i>Morania Abaco</i> .....	40
Three New Dodge Trucks Will Use Cummins Diesels .....	42
Cat's New G342 Natural Gas Engine .....	44
What's Going On In England .....	46
Diesel Service Progress .....	48

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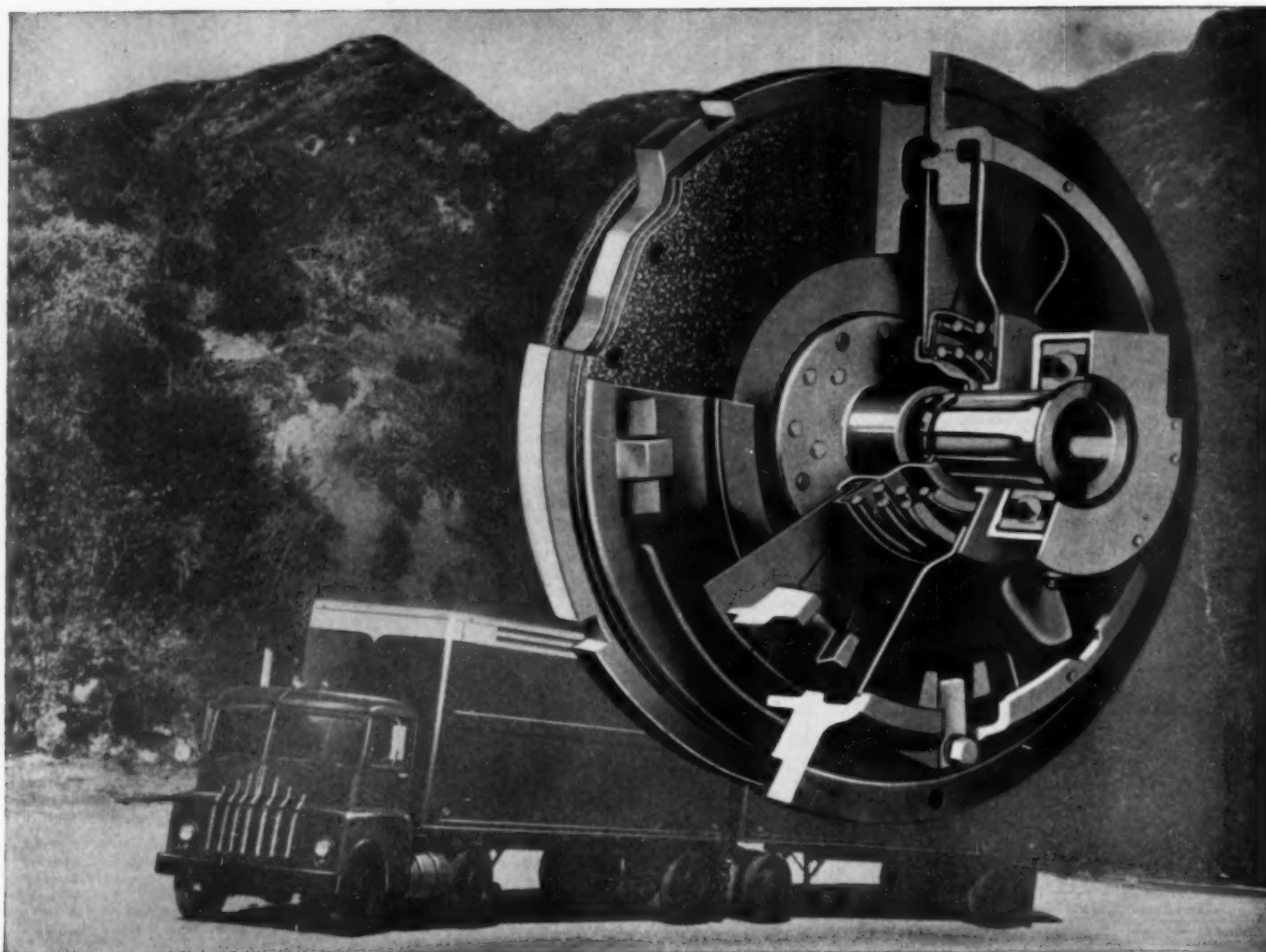
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### FRONT COVER ILLUSTRATION

Rip-rap is placed along a newly widened section of the Calumet-Sag River near Chicago by a 3½-yd. Bucyrus-Erie 71-B dragline powered by a 6-110 GM Diesel engine. The river at this point has been widened to 290 feet for improved navigation.



### Western Fleets Report:

## 150,000 to 200,000 trouble-free miles from Spicer H-D Clutches

Western terrain means rugged service for clutches. Yet, one West Coast operator says, "The only time we touch the Spicer Clutch is at the end of 200,000 miles. Then, we rebuild the engine and overhaul the clutch—whether it needs it or not."

Still another fleet owner states, "We don't even bother with preventive maintenance for our Spicer Clutches. They're absolutely trouble-free from one

overhaul period to another—or about 150,000 miles."

Make sure your clutches last at least as long as the engine by installing Spicer Heavy-Duty Clutches. They're available in a unitized assembly . . . including release bearing, bearing housing and yoke. Specify Spicer on your next job.

For further information or technical assistance contact the Dana Engineer.



### DANA CORPORATION • Toledo 1, Ohio

#### DANA PRODUCTS Serve Many Fields:

**AUTOMOTIVE:** Transmissions, Universal Joints, Propeller Shafts, Axles, Power-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

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Many of these products manufactured in Canada by Hayes Steel Products Limited, Merrifiton, Ontario.

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THE CLIMAX OF A TWO YEAR SEARCH!



# world famous DEUTZ DIESEL ENGINE

now sold and serviced by

**CHRYSLER M & I ENGINE DIVISION**

Two years of searching, studying and testing . . . to find a diesel engine capable of complementing the Chrysler line of gasoline-powered marine and industrial engines. Now the final choice: the famous Deutz Diesel—made in Germany by Klockner-Humboldt-Deutz, proved throughout the world—now sold and serviced in the United States by Chrysler M & I.

## WHY DEUTZ?

After an intensive two year investigation of the diesel engine field—culminating in a three month on-the-spot study by Chrysler engineers of Deutz facilities and Deutz applications in Germany—Chrysler is convinced that Deutz is undeniably one of the most outstanding diesel engines in the world today.

## LOOK AT THE FACTS:

**Air cooled.** Deutz specializes in a line of *air cooled* diesels (16 models; 9 to 300 h.p.); so all liquid coolant problems are eliminated at the outset. It can deliver full power within 30 seconds to one minute after a cold start.

**Durability.** Deutz engines consistently operate 10,000 hours (often as high as 14,000 hours) with no more than routine maintenance. Few diesels can equal Deutz' record of durability; none can better it.

**Manufacturing facilities.** Deutz facilities are unsurpassed by any other diesel engine manufacturer in the

world. Plants have been completely rebuilt since World War II and the most modern equipment and machine tools installed.

**Interchangeability of parts.** Deutz engines have the highest degree of parts interchangeability from model to model of any diesel engine in the field. This reduces parts inventories to a bare minimum.

## SPEAKING OF PARTS!

That's where Chrysler comes in. Right now Chrysler is stocking its nationwide network of engine centers and dealers with a complete inventory of Deutz parts—right down to the fastenings. When this move is completed, Chrysler engine centers will supply on-the-job service and parts for Deutz engines (just as they currently do for Chrysler engines) anywhere in the United States within 8 hours.

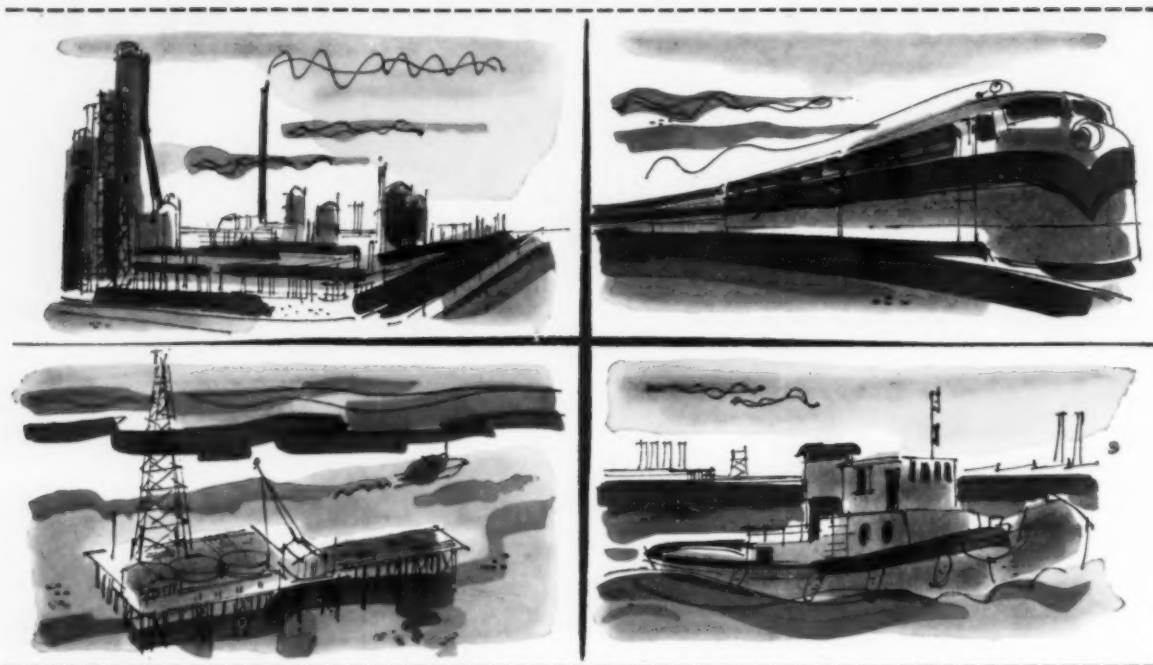
**BUT RIGHT NOW**—while Chrysler engine centers are being stocked—is the time for you to start *your* investigation of the Deutz Diesel, sold and serviced by Chrysler. For literature and information call or write **L. E. Nelson, Vice President—Sales, Marine and Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.**

# CHRYSLER



**MARINE AND INDUSTRIAL ENGINE DIVISION**  
CHRYSLER CORPORATION • DETROIT 31, MICHIGAN





## ***it's KOPPERS Piston Rings***

Where profit depends on keeping equipment in service, engineers recognize the importance of ring performance. That is why Koppers Piston Rings go into the finest engines in the world . . . why they are selected for replacement when better performance is demanded.

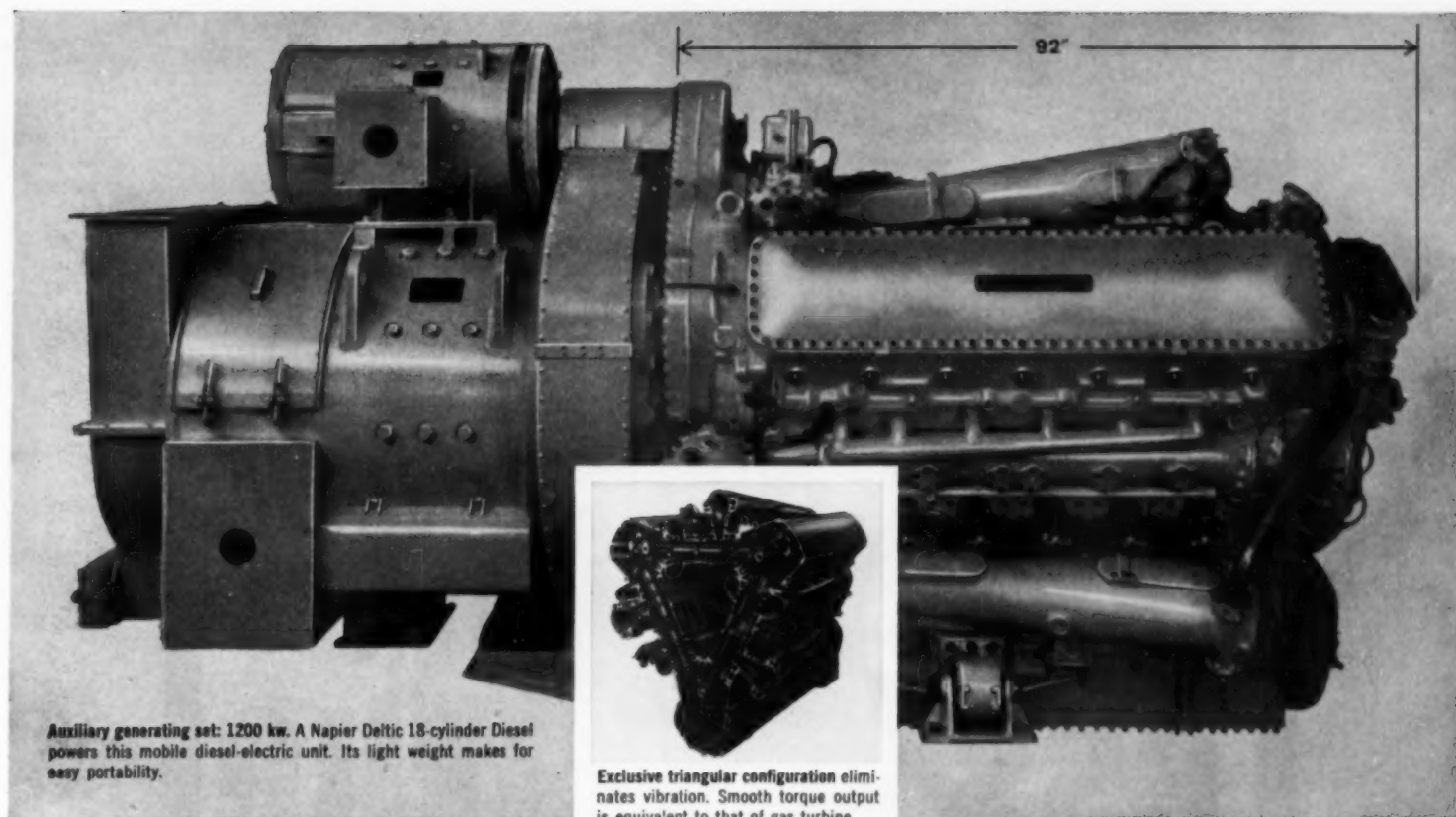
Since the first diesel engine, Koppers has produced piston rings of predictable performance in a complete range of materials and a wide selection of types and sizes. If you have a ring problem, Koppers can offer you the benefit of their experience. Write to: KOPPERS COMPANY, INC., Piston and Sealing Ring Department, 4208 Hamburg Street, Baltimore 3, Maryland.

*Send now for Koppers recommended Piston Ring Set-Ups applicable to the engines which you operate.*



### **PISTON AND SEALING RINGS**

Engineered Products Sold with Service



# NAPIER DELTIC DIESELS:

**COMPACT, LIGHTWEIGHT POWER-MAKERS ON LAND AND SEA**

**Models range from 860 to 3100 bhp... with 9 or 18 cylinders.**

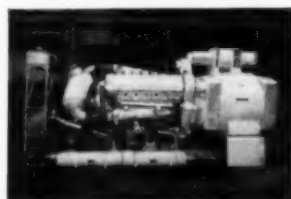
The power-making Napier Deltic is compact and lightweight enough to fit any type of installation within its power range. Weight varies from 7,000 to 13,000 lbs. depending on model. Maximum width is 65", maximum height 90".

You can transport the Napier Deltic over rough terrain without damage. The resilient mountings eliminate foundations, and sustain considerable shock loading.

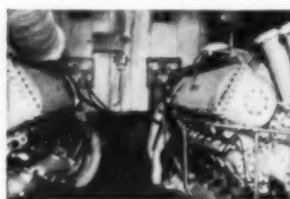
Maintenance and inventory are simplified. Light, sturdy engine accessories are easily accessible. Inventory of spare parts is at a mini-

mum. Engines due for overhaul replaced immediately from stand-by stock.

For more information, write to: Napier Engines, Inc., 909 Dupont Circle Building, Washington 6, D.C. In Canada: write to: D. Napier & Son, Ltd., 4104 St. Catherine St., West, Montreal, P. Q.



Stationary power unit: 1200 kw. peak load and emergency power plant for industry. Auxiliary power for cargo carriers.



Small coastal vessels: 2 Napier Deltics with a continuous rating of 3300 bhp. For tugboats, harbor and coastal craft.



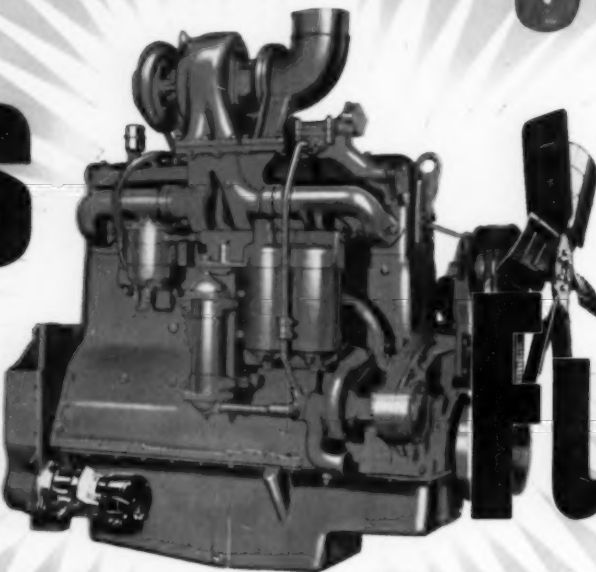
High-speed Launch: Powered by Napier. It achieves 35 mph, carrying 50 passengers. (Photo: John I. Thornycroft & Co., Ltd.)

## **-NAPIER-**

ENGINES INCORPORATED

A SUBSIDIARY OF D. NAPIER AND SON, LTD., LONDON, ENGLAND • A MEMBER OF THE ENGLISH ELECTRIC GROUP OF COMPANIES

# This New Engine Uses Less Fuel Than Any Engine In Its Class



The new Allis-Chalmers 21000 turbocharged diesel engine delivers 340 dynamic horsepower at 2000 rpm — and does it on only  $\frac{3}{4}$  of a cup of fuel, or just .355 lb, — per bhp/hr.

The comparable engine with the next best fuel economy, by published claim, burns between .39 and .40 lb, or almost 10% more.

Another engine in this class burns, according to pub-

lished claims of the manufacturer, .46 lb per bhp/hr — or 29% more. This means 3 extra gallons to every 10.

The Allis-Chalmers 21000 and companion 16000 (naturally aspirated) engines deliver superior performance because of superior, *advanced* engineering—at least two full years ahead. The famous Allis-Chalmers durability and lugability are still included, too — only more so. Let your nearby Allis-Chalmers dealer show you. Allis-Chalmers, Milwaukee 1, Wisconsin.

DE-16

**ALLIS-CHALMERS**  
**POWER FOR A GROWING WORLD**





## HONEYWELL DAMPERS—SHUTTERS

*...built to your specifications for  
accurate, dependable air flow control*

Get the exact shutter, damper or louver you need from Honeywell. Specify any style or type, any blade materials and setting, any edging materials, any operator-mounting arrangement. Louver, round or right angle mixing types available for pneumatic, electric or manual operation. Whatever your needs, you're assured smooth, uniform performance when you specify custom-made Honeywell shutters for dependable air flow control.



## ... AND SHUTTER OPERATORS

*...ruggedly built for precise positioning—electric or pneumatic*

There's an electric or pneumatic motor for every shutter application in the all-inclusive Honeywell line. Two or more motors can be operated in sequence or in unison. Motors can operate two or more shutter sections, provided the combined shutter load doesn't exceed motor capacity.

Available for two-position or proportioning control.

Call your nearby Honeywell field engineer for a discussion of your needs. He's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

### PNEUMATIC MOTORS



**Grad-U-Motor** shutter motor. Three sizes, for operating up to 48 sq. ft. of shutter area.

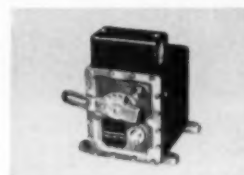


Heavy-duty, pistontype **Grad-U-Motor**. For operating up to 96 sq. ft. of shutter area.

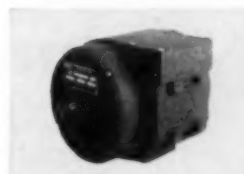


**Air-O-Motor** diaphragm motor. Three sizes, for operating up to 310 sq. ft. of shutter area.

### ELECTRIC MOTORS



**Modutrol** motor operates up to 70 sq. ft. of shutter area.



**Actionator** operates up to 100 sq. ft. of shutter area.

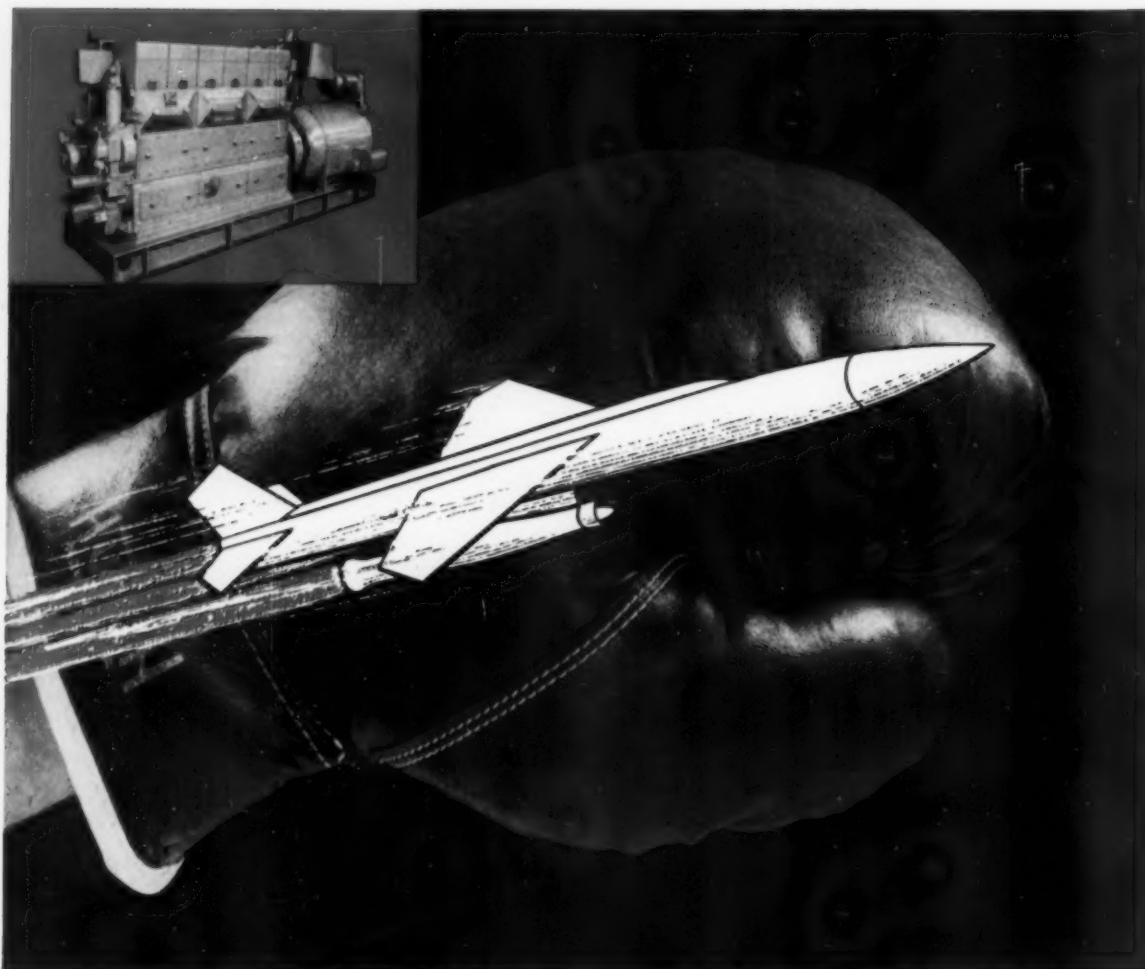


**Series 831E Industrial Motor** operates up to 370 sq. ft. of shutter area.

# Honeywell



*First in Control*



## SUPERIOR ENGINES develop KW... for missile KO!

The warhead carries a missile's big punch, but its fighter instinct is developed by earth-bound electric power. Without reliable ground power, there could be no missile launching, guidance and control, or communication . . . and no knock-out blow!

Already in the U. S. defense ring are dependable White Superior diesel engine generator sets at BOMARC, NIKE and other missile installations. At every round, they are ready with quick, easy starting and continuous, reliable operation. Precision construction takes Superior the limit, too, with trouble-free performance, low maintenance and maximum fuel economy.

In the battle for space, Superiors are veterans, being installed on sections of SAGE, "DEW" line and the "Texas Towers." They will soon find important civilian sky duty also at many of the Federal Aviation Agency's new air-traffic control stations. White can custom-engineer engines to meet your exact needs . . . offers experience with automatic, unattended and remotely controlled operation. If your requirements range from 215 to 2150 HP, or 150 to 1500 KW, get complete information now!

**WHITE DIESEL ENGINE DIVISION**

THE WHITE MOTOR COMPANY, Plant and General Offices: Springfield, Ohio

*White Diesel*



# The Engineer's Field Report

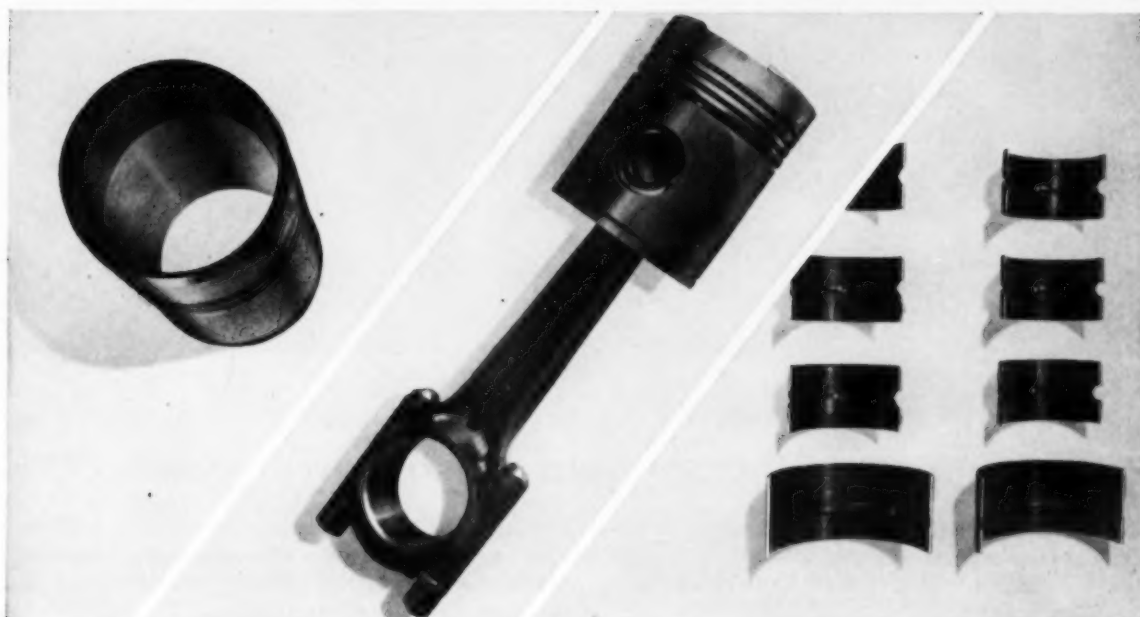
CASE HISTORY

*RPM DeLo Oils*

LUBRICANT

*Progressive Transportation Co.,  
FIRM Compton, California*

## RPM DELO holds piston wear to .001" after 201,253 miles of on-and-off highway hauling



LUBRICATED WITH RPM DELO Oil, these engine parts were pulled from a Cummins HR diesel after 201,253 miles. A portion of this mileage was put on during four months of rugged service spotting loads of heavy pipe in the Arizona desert. When the engine was taken down, after two years of this on- and off-highway hauling, Progressive Transportation Co. found RPM DELO Oil had kept lacquer, gum, sludge, and deposits from forming...rod bearing wear varied between .0005 and .001 inch and pistons showed maximum wear of only .001". No wear at all evident on

main bearings. Progressive Transportation uses RPM DELO Oils in all its large fleet of tractors—some of which have traveled well over 200,000 miles without overhaul.

### Why RPM DELO Oils prolong engine life

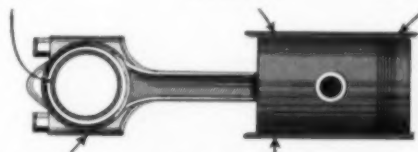
Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps all parts clean



For More Information... about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies below.

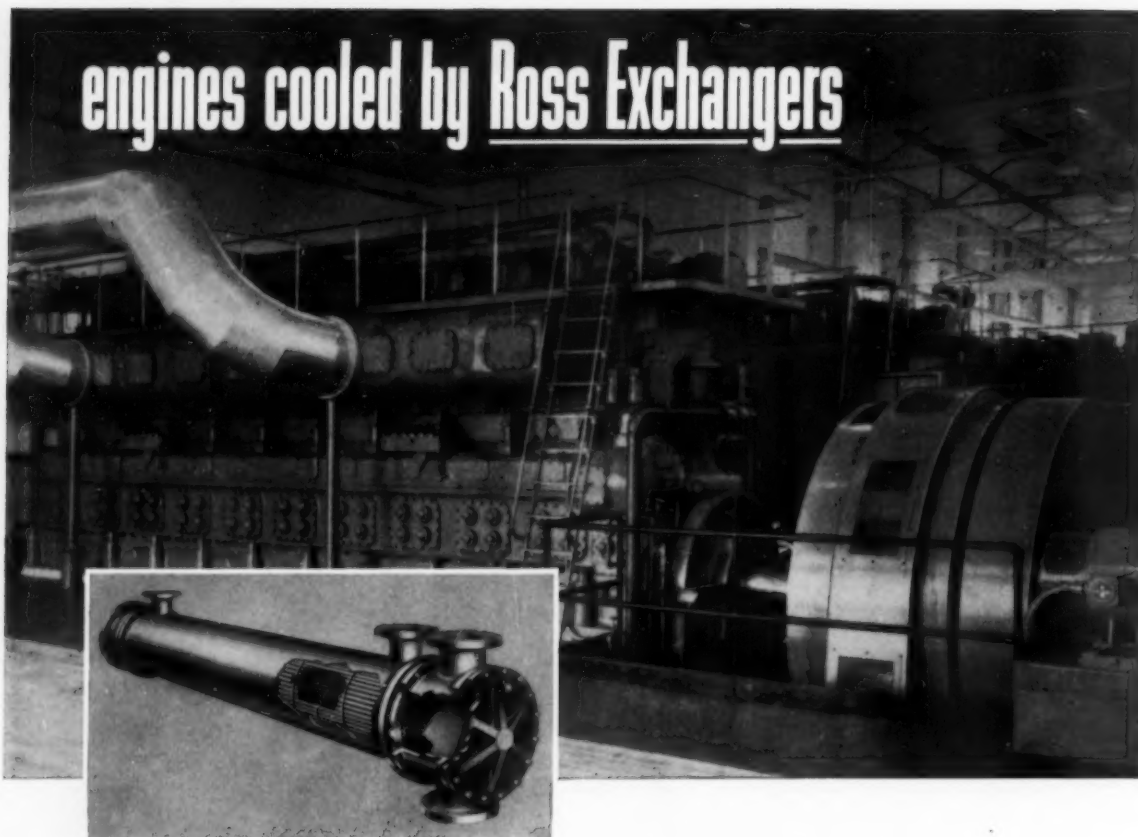


Metal-adhesion qualities keep oil on parts in running or idle engines—inhibitor resists foaming

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso  
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado



## engines cooled by Ross Exchangers



### F-M engine-generators help slash power costs 33%

**CUSHING, OKLAHOMA**—Here in the pipeline center of the world, recent expansion of the municipal electric plant has tripled capacity and driven power costs down one-third!

Major portion of the modernization program consists of two 3500 hp Fairbanks-Morse dual-fuel engines. Each drives a 2500 kw alternator and is turning out power at a fuel cost of just over 2 mills per kwh.

Ross Exchangers play an indispensable role in this noteworthy performance. They cool both the lube oil and jacket water. An ample supply of properly cooled oil is constantly returned to vital moving parts, while engine heat is effectively carried away.

Because of their high thermal efficiency and rugged

construction, Ross Exchangers are chosen consistently for engines, compressors and other prime equipment ... to cool oil, water, air, gas, and hydraulic fluids.

When you're ready to talk "heat transfer"—ask for an American-Standard\* representative. He'll be glad to show you how these pre-engineered Ross units are assembled from standardized parts and sub-assemblies to meet your requirements, exactly.

In the meanwhile, get full details on the wide range of sizes and capacities. Write for comprehensive Bulletin 2.1K5. American-Standard Industrial Division, Detroit 32, Mich. In Canada: American-Standard Products (Canada) Limited, Toronto 4, Ont.



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INDUSTRIAL DIVISION

AMERICAN BLOWER PRODUCTS

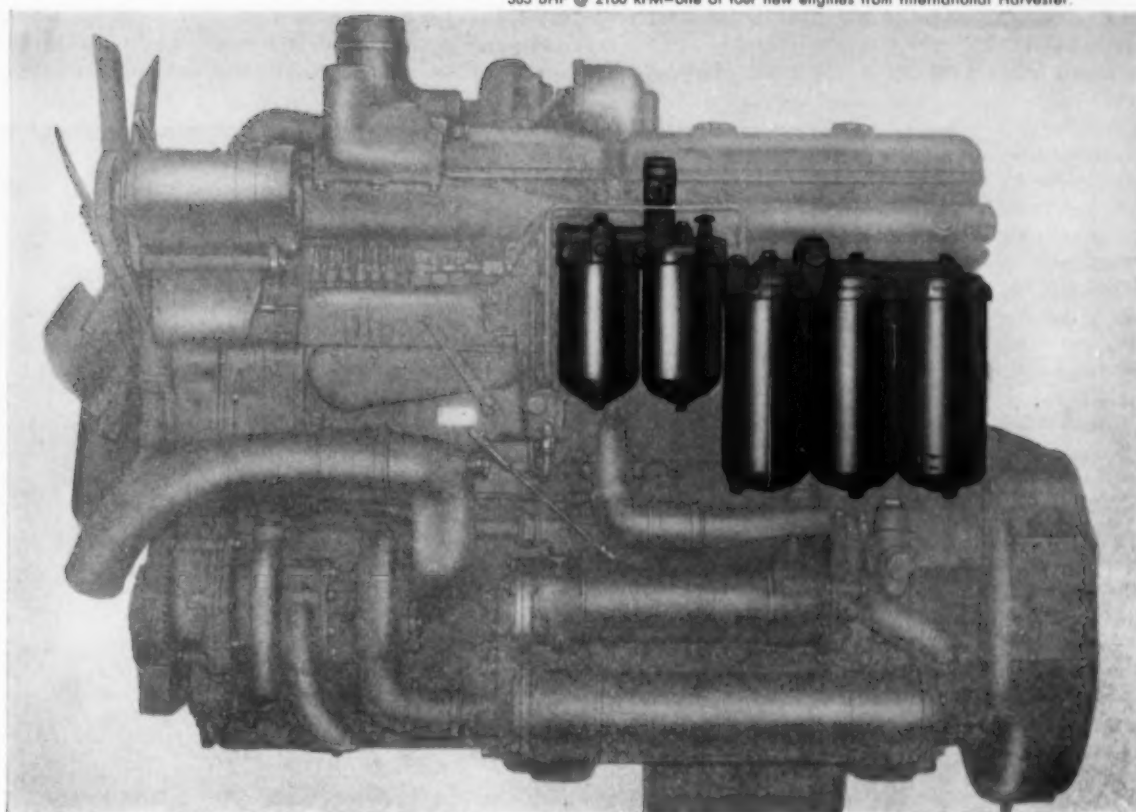


KEWANEE PRODUCTS



ROSS PRODUCTS

This is the UDT-817, a turbocharged, heavy-duty, direct-start diesel engine with 385 BHP @ 2100 RPM—one of four new engines from International Harvester.



**WHY PUROLATOR FILTERS  
ARE STANDARD EQUIPMENT  
ON INTERNATIONAL  
HARVESTER'S NEW LINE  
OF DIESELS**



Purolator is the chief supplier of filters for the lubricating system and fuel system of four new diesel engines from International Harvester. International Harvester tells why:

"Effective filtering of lubricating oil and fuel oil is of utmost importance for long engine life and efficient and economical engine operation. The small additional cost of quality filters is insignificant compared to costly maintenance and downtime expenses which could result from poor filtering. Quality filters are low-cost insurance for an investment of thousands of dollars, as represented by these precision built, high quality engines."

Purolator makes a complete line of filters for fuel and lubricant systems in all types of engines. There is a Purolator filter that is sure to meet your most exacting specifications. Let us know your needs and problems. Our filtration engineers will gladly supply their filtration knowledge and experience—and high quality Purolator filters.

*Filtration For Every Known Fluid*

**PUROLATOR**  
PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA

## Michigan-Ohio News

By Jim Brown

**WOLVERINE** Tractor & Equipment Co. of Detroit and Grand Rapids recently delivered a model H-90-D Hough Payloader equipped with a 3 yd. bucket and powered by a Cummins model JN-6-BI diesel to the Saginaw Asphalt Paving Co., Saginaw, Michigan.

THE new 18-ton Lorain Moto-Crane, the MC-218, has been announced by The Thew Shovel Co., Lorain, Ohio. This 6 x 4 rubber-tired crane utilizes a Lorain-designed and built 180 in. long carrier with box-section side rails, 43 mph highway speed and rocker arm bogie construction.

THE City of Dearborn, Mich., has accepted delivery on two generator sets from Cummins Diesel Michigan, Inc., for installation in the Dearborn police headquarters building. Both sets are powered by Cummins diesels and feature EM generators. One is rated at 30 kw at 1800 rpm; the other is 40 kw.

WILLIAM Lang of Beaverton, Mich., has accepted delivery of a model HD-11-E Allis-Chalmers diesel tractor. It is equipped with a model 11-D-E hydraulic angle blade and was purchased from Earle Equipment Co., Detroit.

PENINSULAR Diesel, Inc., Detroit, has installed a model 6171E GM Diesel engine in a White truck, converting it from gasoline to diesel for John Russian of Detroit.

MICHIGAN model 280 tractor-dozzer powered by a NTO-6-VI Cummins turbocharged diesel engine was recently sold to S. D. Solomon, Pontiac, Mich., by Miller Equipment Co., Detroit. The new dozer is equipped with 29.525 flotation tires, a power tilting 11 ft. 9 in. blade, planetary drive. Weighing 51,300 lbs., it will be broken in on a highway project, the relocation of U.S. 12, near Watervliet, Mich.

F. F. Burnash, Flint, Mich., has accepted delivery on a model 118 Galion motor grader, powered by an International UD-554 diesel engine. The sale was made by Wolverine Tractor and Equipment Co., Detroit and Grand Rapids.

MELVIL O. Eastman of Standish, Mich. has accepted delivery on a model 6028C GM diesel engine for his gravel pump. The new diesel was supplied by Peninsular Diesel Inc. of Detroit.

GRAND Rapids branch of Wolverine Tractor and Equipment Co. has announced the sale of an International TD-20 crawler tractor. The unit was de-

livered to St. Joseph County Road Commission in Michigan.

GRAND Rapids branch of Wolverine Tractor and Equipment Co. has recently delivered an International TD-15 diesel tractor to H. H. Shinville of Kalamazoo, Mich.

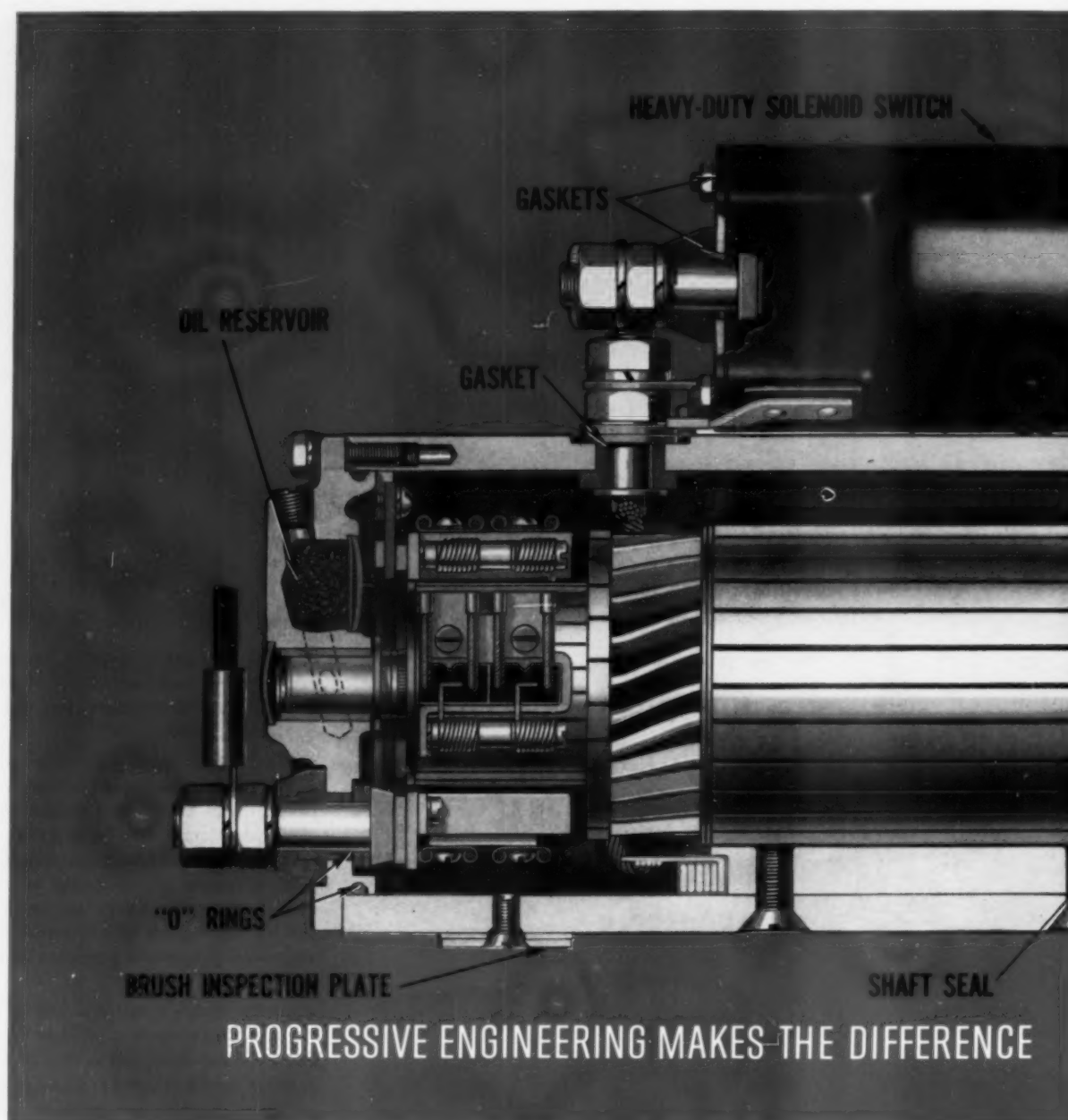
LORAIN model L-56K7 combination

crane, clamshell and dragline has recently been delivered to Walt Connelly of Detroit. The new Lorain is powered by a GM 4-71 Detroit diesel engine and was sold by the R. G. Moeller Co.

CUMMINS Diesel Michigan Inc. of Dearborn has just repowered three model B-60 Mac tractors for the Mackinaw Co. of Essexville, Mich., converting them

from gasoline to diesel operation. Cummins NH-220 diesels were installed, using existing clutch, transmissions.

FRED Wurtzel has joined Telford Equipment Co. of Detroit as a sales representative, according to an announcement by this distributor of LeTourneau, Westinghouse, Cedarapids, Gradall, Littleford and other lines of construc-



## NOW FROM DELCO-REMY—NEW TOTALLY

Delco-Remy now offers a completely new series of solenoid-operated, over-running clutch type heavy-duty cranking motors with the shift mechanism entirely enclosed. Special two-piece drive housings can be assembled to permit a total of 24 different solenoid positions with respect to motor mounting. New 50% longer brushes, together with sealing rings (optional) and large oil reservoirs (optional), assure extra-long operating time between overhauls. And Delco-Remy design features keep these heavy-duty cranking motors positively engaged until the engine starts. Engine manufacturers are

invited to write directly to Delco-Remy for complete information and engineering assistance on the application of these new motors.

TOTALLY ENCLOSED DRIVE SHIFTING MECHANISM is protected against dirt, water, slush and ice. This enclosure plus the shaft seal and linkage seal also prevents transmission oil leakage.

TWO-PIECE DRIVE HOUSING DESIGN permits 24 different solenoid positions. Nose housings available in S.A.E. #2 and #3 mountings.



tion equipment. Mr. Wurtzel's territory will be the northwest part of the lower peninsula.

THE Pennsalt Chemical Corp., Wyandotte, Mich., has accepted delivery on one of the new "long track" model HD-6-DC Allis-Chalmers tractors. The new tractor is equipped with a 16-HS hydraulic 'dozer blade and coal handling

moldboard. The sale was made by Earle Equipment Co., Detroit.

CUMMINS Diesel Michigan Inc., Dearborn, reports that it has installed a model NH-180 Cummins diesel engine in a new Ford truck for Bob Ford, Inc., Dearborn, a Ford truck distributor. The installation was done at the request of Clifford Wallace, a broker from Cold-

water, Mich., for Automobile Transport of Novi, Mich. Cummins Diesel also reports that this is the first NH-180 installation in this area. Transmission is a Spicer 6453-A.

THE R. G. Moeller Co., Detroit has sold a model 440-ICD John Deere crawler-loader to George Adema of Birmingham, Mich. The loader has a  $\frac{3}{8}$  yd.

bucket, is powered by a model 2-53 GM Diesel engine and weighs 9300 lbs.

L. C. (Lou) Hasper, former resident of Muskegon, has been appointed a sales representative for Wolverine Tractor and Equipment Co., Detroit and Grand Rapids, according to an announcement by Wolverine's president, Tom McNutt. Mr. Hasper will handle the sale of International Harvester, Galion, Hough, Drott and Superior equipment and Union wire rope. His sales area will include nine counties in the southwest corner of the state.

THE Alpena County Road Commission of Alpena, Mich., has converted its Hough HO Payloader from gas to diesel with a model 4055C GM diesel engine, purchased from Peninsular Diesel Inc.

TOLEDO Excursion Lines, Inc., Toledo, Ohio, purchased a 33 kw, 1800 rpm single phase generator set, powered by a Cummins HRC-4-I diesel and with a Marathon generator, from Cummins Diesel Michigan, Inc., of Dearborn, Mich. The generator set will be used to supply electricity for all of the concession equipment aboard the excursion boat *Canadiana*, currently running between Toledo, Ohio, and Bob-Lo Island in the Detroit River.

MIJAL Bros. of Plymouth, Mich., is breaking in a new Allis-Chalmers HD-6-E tractor with a 6-BE hydraulic bulldozer blade. The new tractor is being used by Mijal Bros. on its peat farm. It was purchased from Earle Equipment Co.

#### Panellit Appoints Lorig

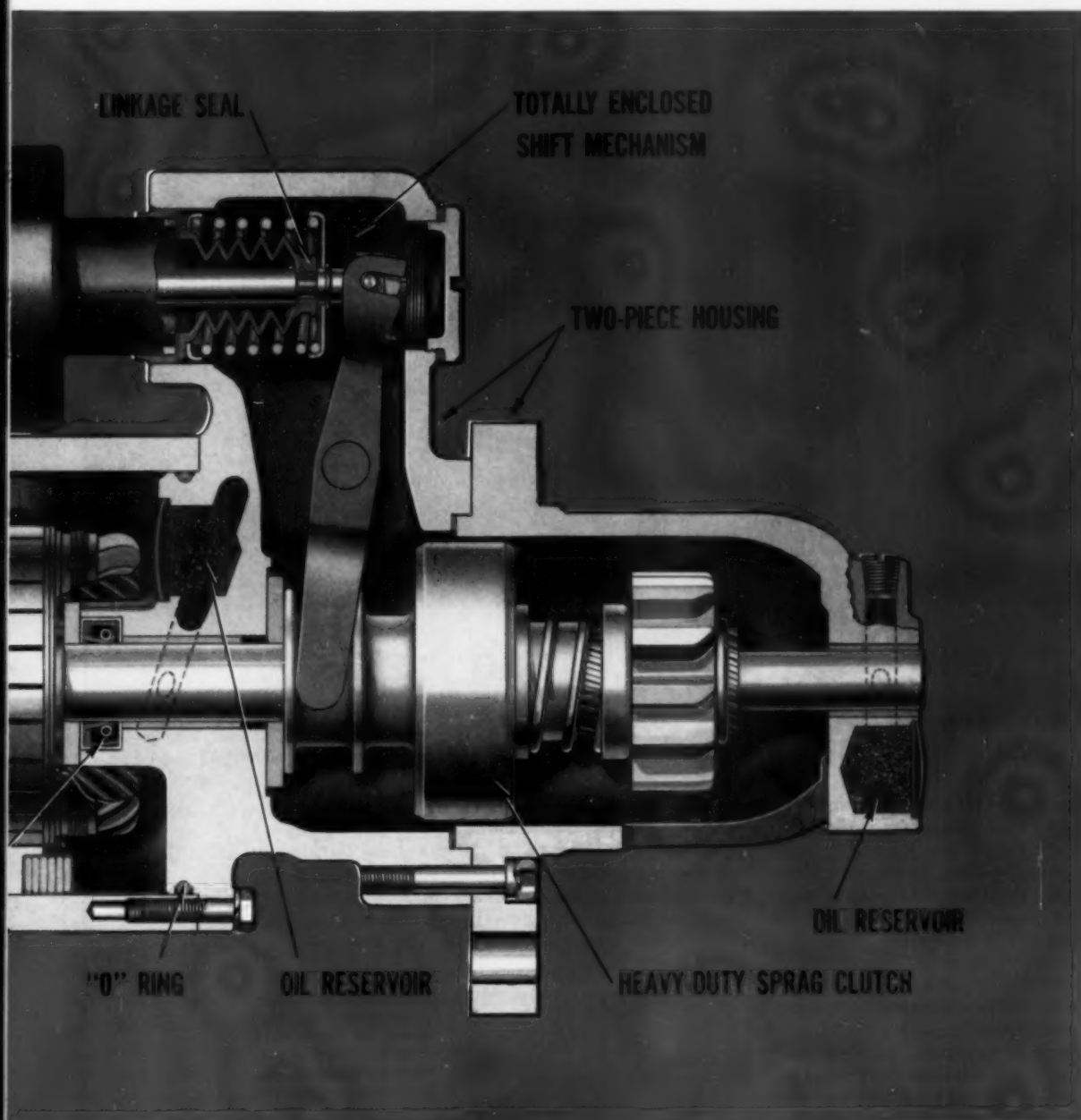
Mr. Marvin B. Lorig has been appointed vice president and general manager of Panellit Service Corp., Skokie, Ill. Lorig has been associated with the parent firm, Panellit, Inc., since 1947 and as a vice president since 1952.

#### Wilkening Names Erwin

Mr. Helmuth G. Braendel, vice president in charge of engineering for Wilkening Mfg. Co., Philadelphia, Pa., maker of Pedrick piston rings, has promoted Mr. James Ewell Erwin, Jr., from service engineer to assistant chief engineer. Erwin joined the Pedrick organization in 1951. He is a graduate mechanical engineer of Virginia Polytechnic Institute, Blacksburg.

#### CFC Names Distributor

The Jesse W. Eakins Corp., 15875 James Couzens Highway, Detroit, Mich., has been appointed to represent Commercial Filters Corp. in Michigan. Products include the complete line of Fulflo filters and CFC Honan-Crane Filters.



## ENCLOSED HEAVY-DUTY CRANKING MOTORS

**HEAVY-DUTY SOLENOID AND SWITCH** provide positive pinion engagement and safely handle maximum starting current. Special seals increase contact life.

**SPRAG CLUTCH DRIVE** operates with non-chamfered ring gear. Pinion indexes on spiral spline, positively engages ring gear before power switches on, and does not become disengaged with sporadic engine firing.

**HEAVIER BRUSH INSPECTION PLATES** resist damage from use and handling—are sealed to prevent leakage to motor interior.

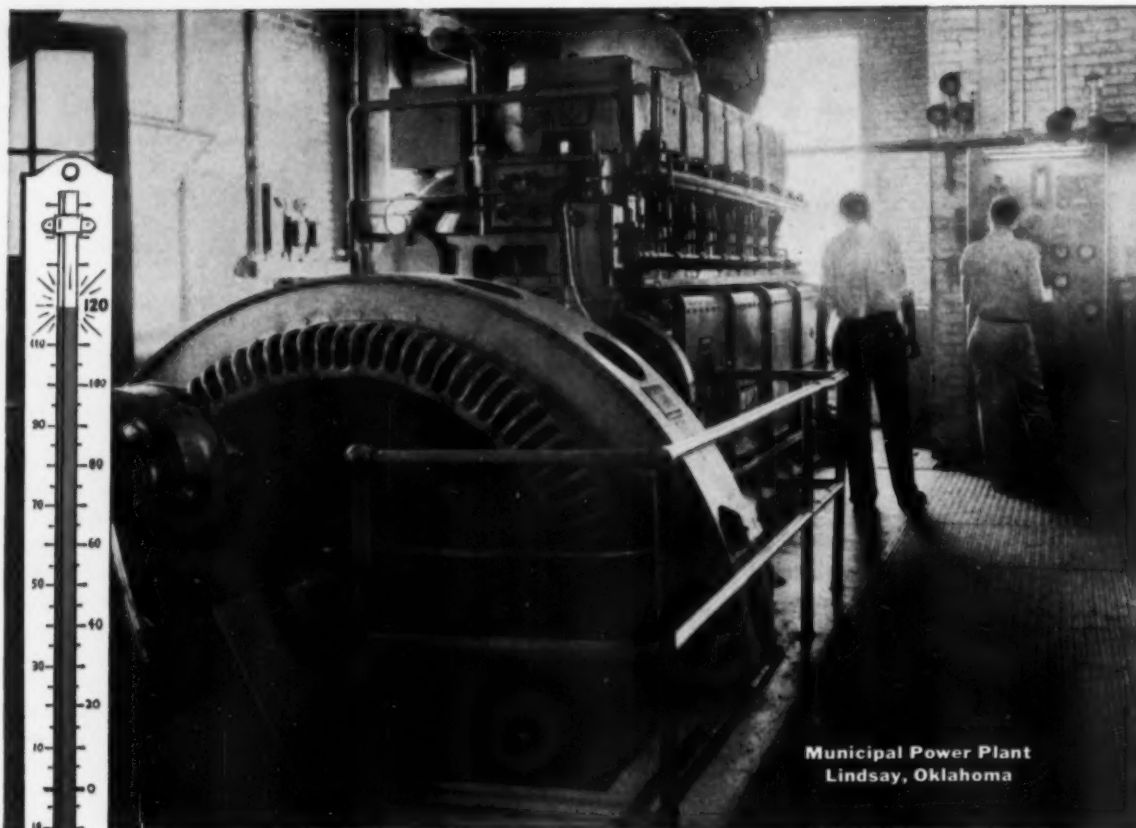
GENERAL MOTORS LEADS THE WAY—STARTING WITH

**Delco-Remy**



ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA



Municipal Power Plant  
Lindsay, Oklahoma

## Plant temperatures 120° and higher...

**But 3-year-old Nordberg gets 16,000 H. P. hrs.  
per gallon of Cities Service makeup oil**

If you think the summers are hot where you come from, go down to Lindsay, Oklahoma during the "broom corn" season.

There, you'll find temperatures holding well above 100 for days at a time. Moreover, if you venture inside Lindsay's Municipal Power Plant, you may find the temperature in excess of 120 degrees.

Under any circumstances, this would be mighty tough on generating equipment—but for Lindsay it's doubly tough because during the broom corn season, equipment operates at 90% of rated capacity.

Nevertheless, by protecting their workhorse Nordberg with Cities Service DC-300 Lube Oil, Lindsay has avoided all problems. In fact, the town has piled up an enviable record: Its 3-year-old Nordberg gets 16,000 H.P. hours per gallon of Cities Service oil—and with well over 20,000 hours' service, micrometer tests reveal no measurable wear on any engine parts!

Multiply Lindsay's experience by scores of other power plants around the country, and you have a pretty good idea why Cities Service DC-300 Lube Oil is in constantly growing demand. To find out what this superior lubricant can do for you, talk with a Cities Service Lubrication Engineer from the nearest branch office. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



**"BROOM CORN,"** grown in Lindsay, Oklahoma, has direct relation to power output and maintenance. Major power requirements come during "broom corn" season, which also imposes terrific heat. Plant temperatures sometimes shoot beyond 120 degrees.

**CITIES  SERVICE**  
QUALITY PETROLEUM PRODUCTS



# HEAVY FUEL CUTS COST AT ST. CLOUD

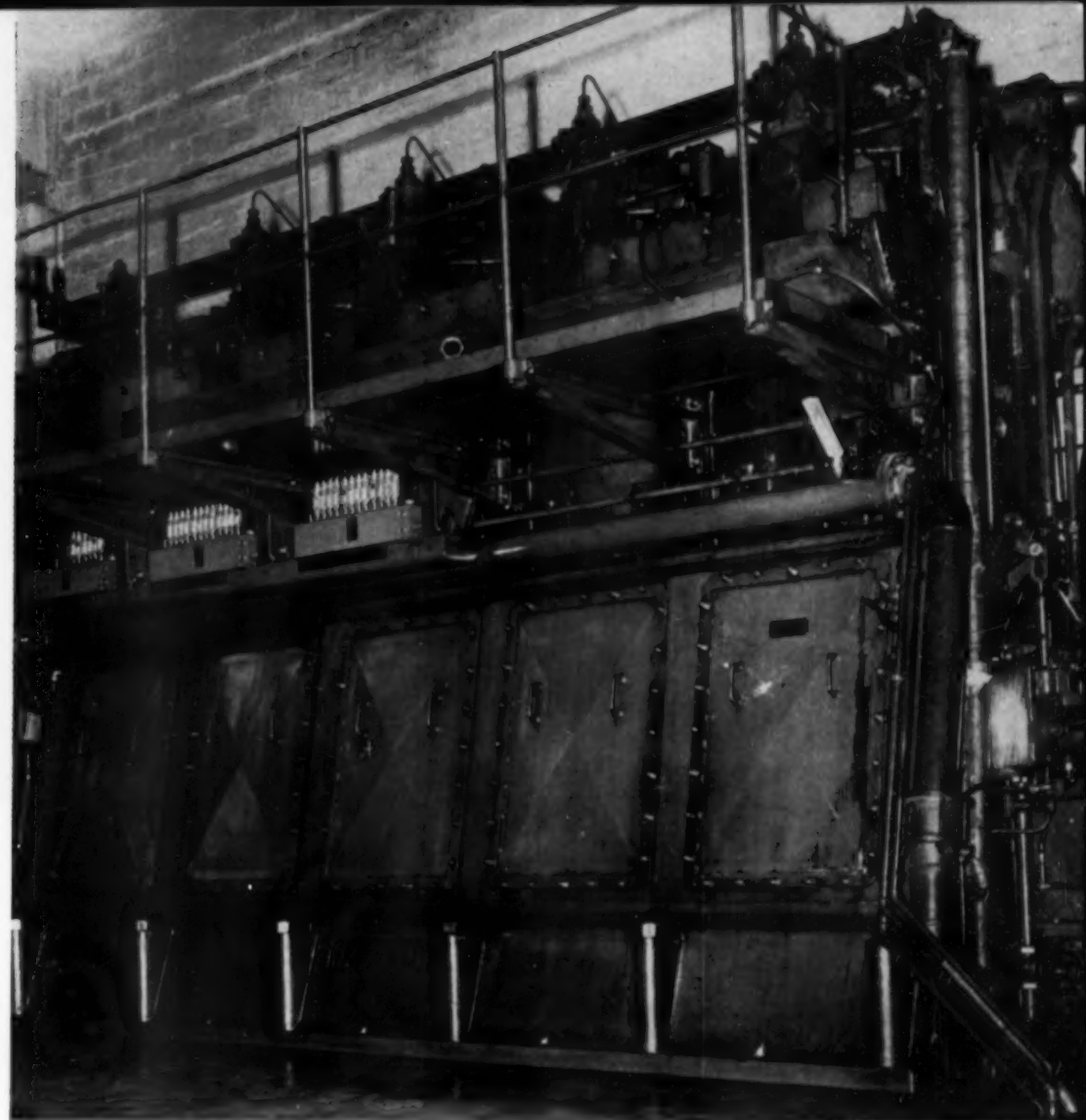
By ED DENNIS\*

**T**HE City of St. Cloud's municipally owned electric power plant has been the largest single source of income for that city for a good many years according to the city fathers. From its start, in 1916, up to the present date, with its comparatively low rates for electricity, it has provided the bulk of the city's revenue thus allowing the city tax assessor to keep taxes to a bare minimum. At the present time, 47 per cent of the city's income is derived from the operation of this plant. Ever since the first diesel engine was installed, back in January 1917, the plant has had an enviable record of good power plant operation. The citizens of this small community can be justly proud of their plant as it is one of the most efficient and economically run power plants in the State of Florida. This is due in considerable extent to the efforts of J. C. Gallatin, general superintendent of the Utility & Water Department.

The plant means much more to the city than its financial stature as it has been a way of life to the community since 1916. It was in that year that an aggressive city government planned a development program that purchased the power lines of the old Seminole Land Investment Co. and two 100 hp Y type Fairbanks-Morse diesel engines directly connected to two 75 kva 60 cycle 2300 volt Fairbanks-Morse generators to put the new station into operation. This modest station grew through the years into today's modern plant with a 1958 output of 12,574,800 kwh.

St. Cloud, located on the shores of East Lake Tohopekaliga in the heart of Florida's cattle country, dates back to about 1890 when a sugar plantation was started and a cane crushing mill constructed near the present city's limits. Sugar was grown on about 400 acres of land, the cane was crushed, processed and the sugar shipped via canal and lakes to the St. Johns River and then eventually to the northern markets. This lasted until about the turn of the century when the sugar cane dominion crumbled and soon thereafter the mill was sold and transported elsewhere. In 1893, the Diston Co. planted rice but as the land was not suited for rice growing, it too was a dismal failure. History does not reveal much of the area doings until about 1910 when the Seminole Land Investment Co. platted the city and sold the first lots to war veterans. Some of the old timers recall that the city was planned and developed as a high grade residential community with just enough business locations to service that kind of a community.

The city wasn't exactly an immediate success for in 1917 the daily peak load was only slightly over 100 kw and the plant was only operated from sundown to 11:00 pm. The following year the time was extended until midnight with an extra



The model 21-SA five cylinder Hamilton diesel engine manufactured by the Baldwin-Lima-Hamilton Corp. This 21½x27½ inch diesel is rated 2500 hp at 257 rpm and drives an Allis-Chalmers 1875 kw ac generator. Note Manzel Lubricators.

two hours on Tuesday mornings so that the housewives could iron Monday's wash. And as the years rolled by, the land that formerly grew rice and sugar cane, took on a new look with acres upon acres of citrus groves and beef cattle plus the natural seasonal influx of "yankee tourists". As the population grew and the amount of electricity used in each household increased it became apparent that the existing engines had too much difficulty handling the loads. The plant had increased its lines to serve about 200 customers and the plant had to operate around the clock.

So in 1920 a four cylinder, 200 hp 150 kva, Fairbanks-Morse generating set was added thereby doubling the plant's capacity. During the Florida land boom in 1925, another Fairbanks-Morse set was added. This time it was a six cylinder 360 hp 300 kva generating unit. This set is still in operating condition and is sometimes put on the line when the demand load is extremely heavy. In 1935 the plant expanded again, this time with a 360 hp 215 kw Superior generating set. The combined generating units took care of the city's electrical needs until the post war influx of people prompted the Utility Commission, in 1946, to ask for bids on an additional diesel generating set. The commission, which had accumulated a sizable reserve bank balance during the war years, was able to pay cash for the new eight cylinder 1200 hp 900

kw Superior generating set and also to expand the power lines. Electrical demands grew beyond expectations in the next few years, and to take care of the needs for, what they thought would be, "many years to come", they added another Superior diesel generating unit in 1948, this time with a 1000 kw capacity.

However the "many years to come" didn't last very long and in 1956 it was apparent that the existing engines would have difficulty handling the heavy loads anticipated for the heavy postwar influx of tourists and permanent residents streaming to the Sunshine State, especially during the winter months. Confronted with this demand for additional electric power, the City Commission decided to purchase an additional generating unit. Another important decision to make was whether to use #2 fuel oil with its relatively high cost of power production or to switch to #6 fuel oil and take on a few headaches. Fuel economy is a must in an operation of this kind due to the fact that the State's big utility companies tend to swallow up the small municipally owned power plants.

The city officials decided to purchase and install a model 521-S-A Hamilton diesel engine manufactured by the Baldwin-Lima-Hamilton Corp. This 21½ by 27½ in. two cycle five cylinder die-



The City of St. Cloud Utility Commission in front of the 2500 hp Hamilton heavy fuel oil burning diesel. L. to R: Mayor Belden Warner, chairman; Ray W. Backer; James Parker; and James C. Gallatin, General Superintendent of the Utility and Water Department.

The two Hilliard Hyflow fuel oil filters model FC 4-1 used in the filtering system of the heavy #6 fuel oil.



sel is rated 2500 hp at 257 rpm. It drives an Allis-Chalmers generator with a rated capacity of 1875 kw—1700 kw net. The new unit went into service in Sept. 1956 and quickly demonstrated its value to the plant by its economy and efficiency. The combined generating units give the St. Cloud plant a total of 7340 diesel hp with a generating capacity of 5050 kw. This gives the plant considerable flexibility in meeting various load demands in the heavy winter season and the lean summer months. In 1955 a 1500 kva 25,000 volt tie line was constructed with the neighboring city of Kissimmee's power plant and an interchange agreement was reached. In the annual report of the power plant for the 12 months ending in October 1957, the Hamilton generating unit had a fuel consumption of 485,556 gals. of #6 oil and 22,

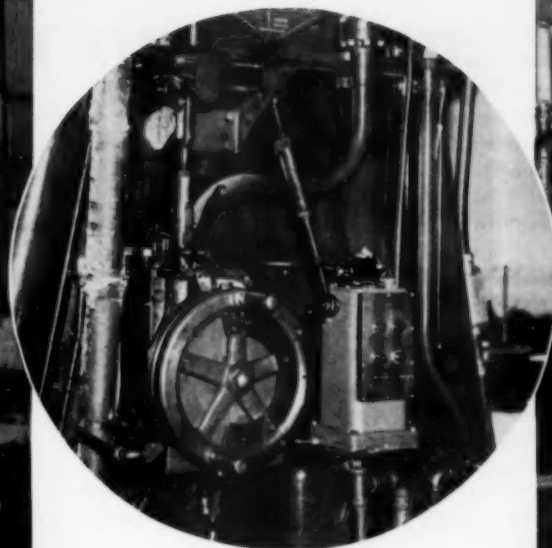
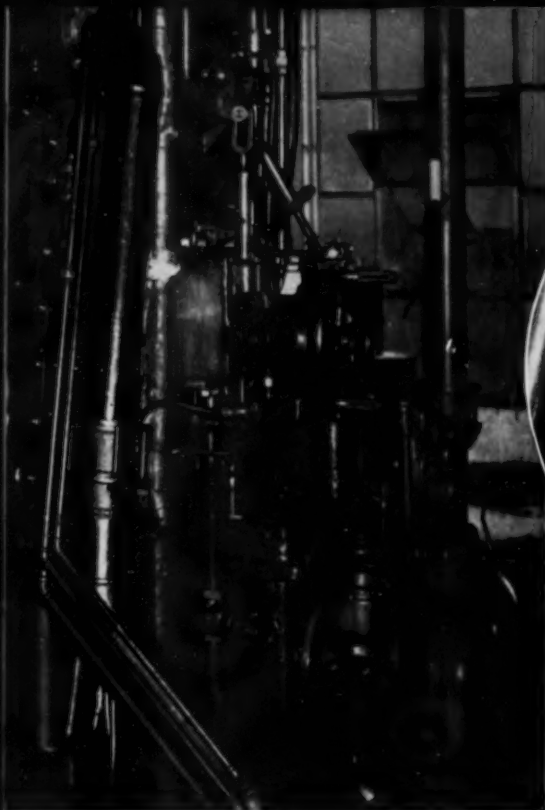
913 gals. of #2 fuel oil, total kw hours generated on this #5 power unit was 6,917,000 or better than 13 kwhs /gal. In 1958 this jumped to 7,946,000 kw.

A characteristic of this Hamilton diesel shows a combination of "stand up and take it" ruggedness along with its other features of good designing. All parts are accessible for easy maintenance. In speaking to Plant Superintendent Gallatin, he credits the engine's low maintenance to the two cycle, single acting, loop scavenging design. Another feature he likes is the rotary valve design and the enlarged combustion chamber that works in close harmony with the entire scavenging system. This is one of the features responsible for the excellent performance of this diesel, in that it permits substantially more air to be entrapped for

combustion at regular compression pressures. The inlet and exhaust porting has been designed to function as a compliment to the rotary valve and the entire scavenging system. An important element in the reduction of the plant's power costs has been the efficiency and fuel economy of this new Hamilton and its use of #6 fuel oil. The plant uses #2 fuel oil which costs 10.29 cents a gal. and Pure Oil #6 fuel oil costing 6.43 cents a gal.; a daily fuel savings of from \$80 to \$100.

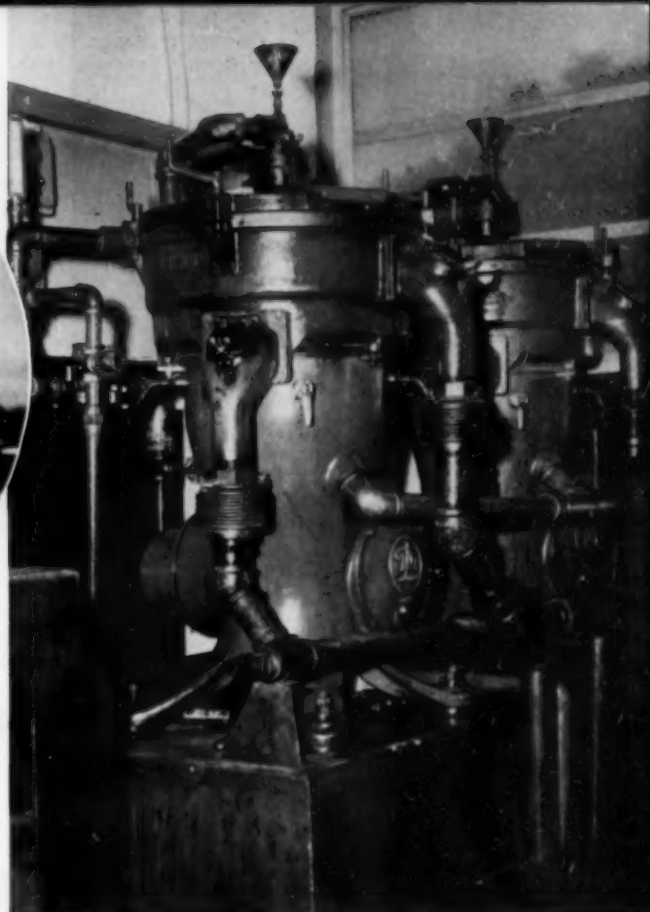
As Supt. Gallatin tells the story, "Our troubles have only been minor ones. We have run the new generating unit without a let up for as long as three months and so far we have had to do only routine checks and adjustments and small minor repairs such as changing the injectors because the #6 fuel oil is a bit rough on them. The only major repair work done on the engine has been replacing the piston rings." When the Hamilton is stopped for any reason during the peak winter season, all the other generating units have to be put on the line to carry the load and within the next couple of years another heavy duty generating unit will have to be added. This is an expanding plant with a constantly expanding load. The year 1958 showed the largest jump in electrical consumption with an increased output of 23.6 per cent over 1957 and a peak load demand of 3700 kw. This expanding trend promises heavier and more efficient load demands on the Hamilton generating unit which should result in greater fuel economy for the plant through the greater use of #6 fuel oil.

Speaking at the annual Chamber of Commerce dinner, Mr. William T. Wallis, manager of the First Federal Building & Loan Association of Osceola County, made some amazing statements among which was that, "St. Cloud has grown 90 per cent in the last ten years, 518 new homes have been added to the community" and he predicted, "the city will double in size within the next ten



The front end of the Hamilton diesel showing the operating controls and the Woodward UG32 governor.

The two model 94-21 DeLaval centrifuges which are used to purify the heavy fuel oil.

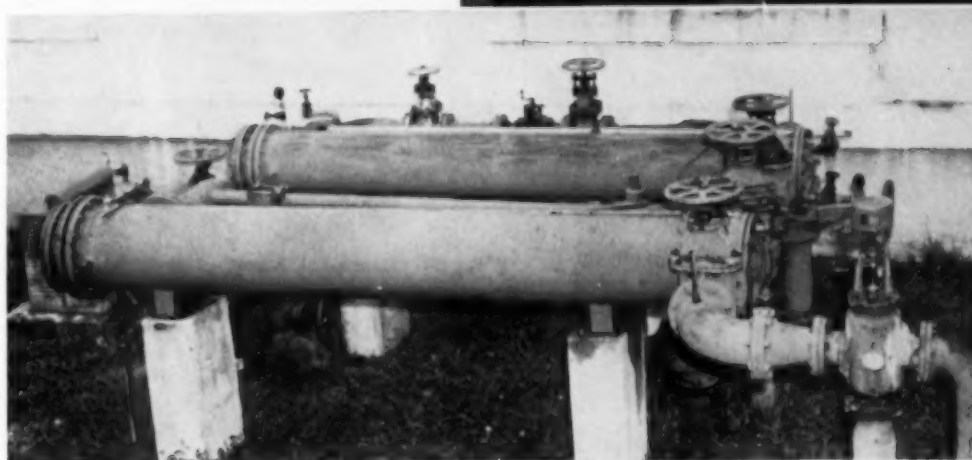


years." With that thought in mind, the city fathers will have to think of additional expansion in the very near future. One of the main contributing factors to this successful operation is the excellent way the #6 fuel oil is handled. This Pure Oil Co. fuel originates at the Smiths Bluff Refinery and is trucked via hi-way tankers from Tampa to St. Cloud where it is stored in a pair of 25,000 gal. tanks. The #2 Texaco oil is also stored in the same area in a pair of 25,000 gal. tanks. Transfer pumps and heat exchangers work together to get the heavy fuel from the tanks to the separators. The oil is then pumped to a booster via a day tank, filters and a few more heat exchangers. At the booster the oil's temperature is raised from 200 to 260°. The heavy fuel is then pumped at this temperature to the fuel header and the individual pumps and injectors. A temperature regulator is used in the system to maintain the heavy fuel's 200° temperature up to the booster. Individual fuel oil pumps are mounted opposite each cylinder head above the camshaft which actuates them. The Hamilton design permits very short high pressure injection lines which contributes to its ability to burn the heavy, viscous #6 fuel oils.

The physical characteristics of the #6 fuel are:

API gravity at 60° F.	10.5 to 12.5
B. S. & W	0.2%
Flashpoint	300°
Sulphur	1.25%
Carbon range	6.5 to 7.5%

Fuel oil #2 is used for starting and for about three or four minutes, then the engineer opens a hand operated valve for the cross over to the heavy oil. As soon as the #6 fuel pressure drops 10 lbs. pressure, the #2 fuel opens a spring loaded check valve and the engine continues to operate. The engine is also allowed to run on the light fuel for about 10 minutes before shutting down to purge the pumps, injectors, and fuel header of the heavy oil. Since this is a two cycle engine the



The Ross heat exchangers used in the jacket water system along with the Fulton-Sylphon control valves are located outside the power house.

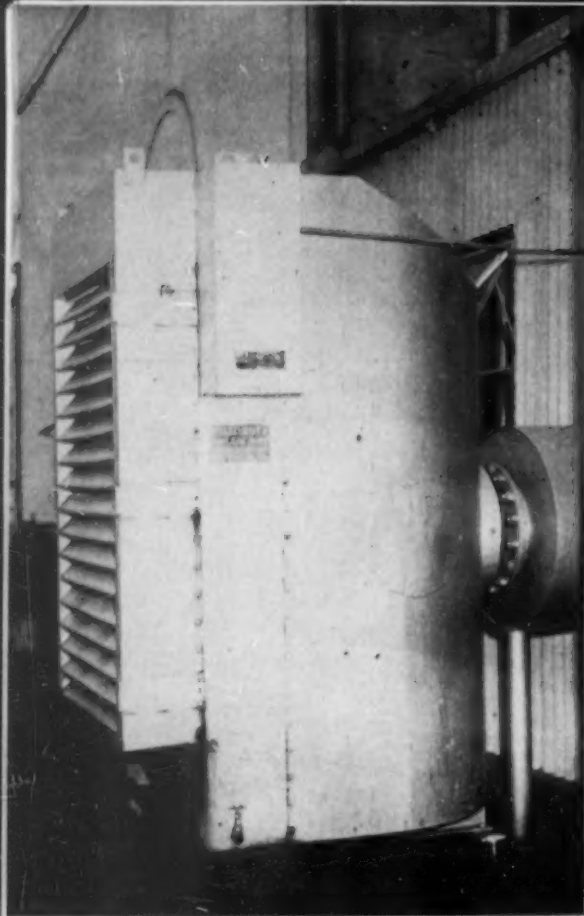
The Burgess-Manning waste heat recovery silencer which is used to produce steam for heating the heavy #6 fuel oil to 200° F. for centrifuging and filtering.

problem of sticky valves, etc., has been eliminated and the ports keep clean on either fuel.

Supt. Gallatin said that they just about have the lubricating oil problems licked. For all main driving parts, crankcase, etc., which are subject to forced lubrication, they use Esso Diol #65. It is a non additive straight-mineral base lubricating oil. Esso Tro-Mar DX130 oil is used in the three lubricators for cylinder lubrication. A before and after lubricating pump is located at the base of the Hamilton generating unit at the side of the 1200 gal. sump tank. This pump is used to lubricate the engine parts before starting. The rotary lube oil pump mounted at the free end of the engine takes over after the engine is started. If for any reason the main lubricating oil pump should fail or if





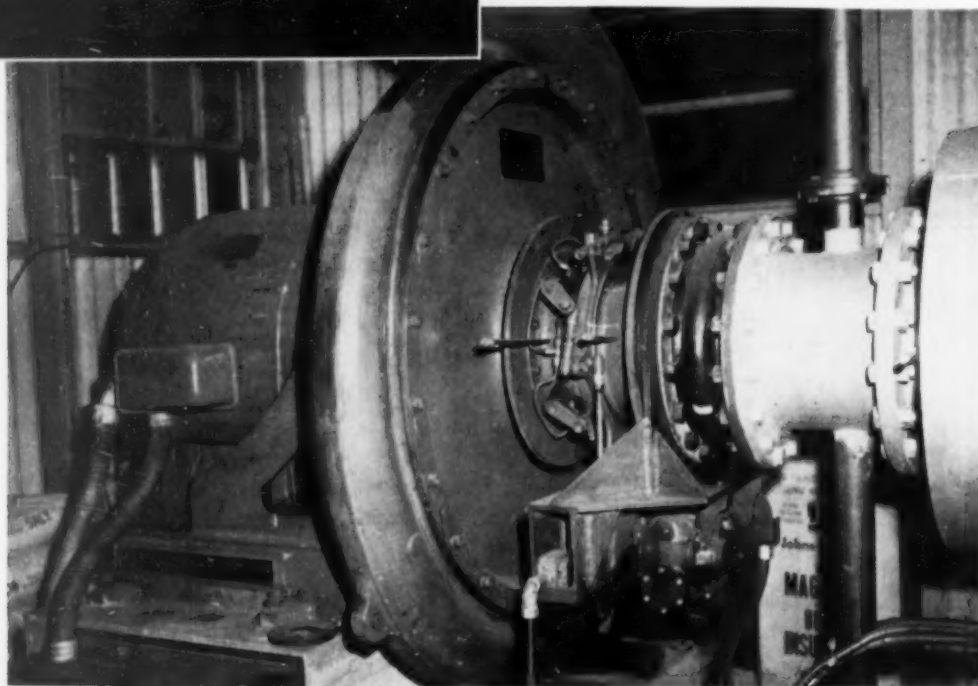


the oil pressure drops below a set pressure, this before and after pump automatically cuts in to provide the proper lubricating oil pressure for the engine. The lubricating oil temperature is maintained at 120° to the engine and 145° max. from the engine. The engine uses a cartridge type filter and a duplex strainer in the oil system. This method, which uses heat, vacuum, Fullers earth and mechanical filtration to combat dilution and contamination, has proven very successful in maintaining a constant flow of clean oil. They batch the lubricating oil about once a month and samples are sent to the oil company for analysis where among other things, a very close check is made for acid formation, which could cause excess wear. Heat exchangers are used in the oil system to keep it at its correct temperature.

The plant has adequate cooling water as it is con-

◀ The American air filter used in the air intake system of Hamilton engine.

Motor driven American Blower supplies scavenging air for the 2 cycle diesel. ▶



compressor driven by a 10 hp electric motor located at the base of the engine. Two 250 lb. pressure air tanks are located on the main floor.

Another of the requirements in successfully handling #6 fuel oil is the heating of the heavy substance to a degree where it can easily be handled and pumped to the various purifiers and filters. Here at St. Cloud, a part of this important job has been accomplished by the use of the engines hot exhaust gases. This exhaust is piped from the engine's manifold to an exhaust snubber, inside of which is a set of coils where the hot exhaust gases are used to produce steam. This steam is maintained at 15 lbs. pressure and at 230° temperature to heat the #6 fuel oil to 200° while the oil is passing through the various filters and separators. An automatic steam boiler is used as a standby in this #6 fuel oil heating system.

The whole history of St. Cloud's utility system can be summed up in its Superintendent, J. C. Gallatin, who is affectionately called Mr. Electricity by the local population. The plant's progressive management comes under the Utility Commission which consists of Mayor Belden Warner, Ray W. Backer, James Parker and Gallatin. The city has an up to date fire and police department and about 32 miles of its streets are paved and illuminated. Its regular population of 4500 persons expands to about 7000 during the winter season. The electric plant normally supplies current to 2648 customers with an increase of about 500 more in the winter months. Credit for the successful operation of this plant should also be given to Chief Operator Michael Peterson with 43 years of service and to Dan E. Armstrong, chief plant engineer with 31 years of service. These two men along with Gallatin have given a total of 116 years of service to their community.

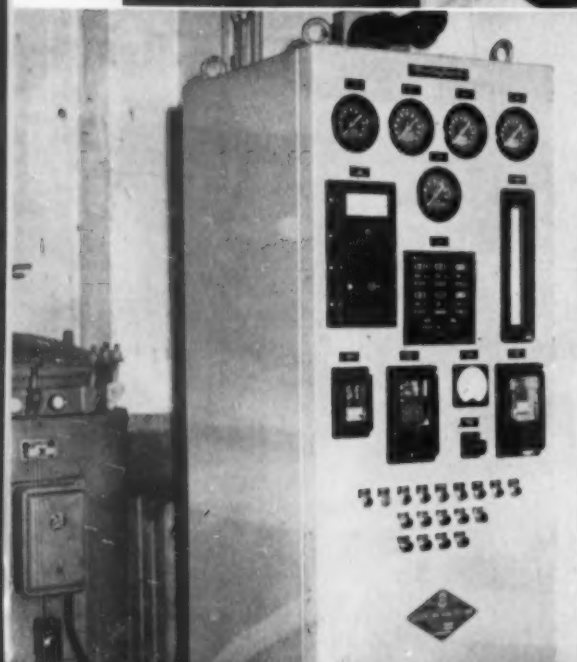
*\*This article was written mainly on the Hamilton diesel generating set and the #6 fuel oil phase of the expansion program at the City of St. Cloud. I would like to thank the staff of the St. Cloud News for their assistance in helping to obtain the historical background.*

### Principal Equipment Serving 2500 hp Hamilton Engine

Generator & exciter	.....	Allis-Chalmers
Motor-driven blower	.....	American Blower
Governor	.....	Woodward
Heat recovery silencer	.....	Burgess-Manning
Lube oil coolers	.....	Ross
Intake air filter	.....	American
Fuel injectors & pumps	.....	American Bosch
Fuel oil centrifuges	.....	DeLaval Separator
Fuel oil filters	.....	Hilliard
Lube oil filter	.....	Hoffman
Air compressor	.....	Worthington
Thermostatic controls	.....	Fulton-Sylphon
Pyrometer	.....	Alnor
Switchboard	.....	Westinghouse
#6 fuel oil	.....	Pure
#2 fuel oil	.....	Texaco
Lube oil	.....	Esso
Lubricators	.....	Manzel
Cooling tower	.....	Marley
Consulting engineers	.....	A. P. & R. K. Michael, Orlando, Fla.

◀ To left is Hoffman cartridge filter used in the lubricating system. The Westinghouse switch board for the Hamilton diesel incorporates an Alnor pyrometer.

nected to the city's water supply lines. The design of the Hamilton is such that it can insure an even thermogradient throughout the whole engine. Cooling water enters at the bottom of the engine cylinder block, makes two passes around the block before going at high velocity across the port area and around the combustion space. It is a fresh water enclosed system using a double-flow cooling tower. Two heat exchangers located outside the building and control valves are also used in the cooling system. Jacket water temperature is maintained at 115° inlet and 130° outlet. Compressed air starting for the Hamilton is provided by a two stage air





# MIDWEST TOWING ADDS M/V *BADGER*

**T**HE new 3200 hp towboat *Badger* will soon be delivered to the Midcontinent Barge Co. and will be operated by the Midwest Towing Co., Inc. The vessel was christened Mar. 26, 1959 by Mrs. Carl Forzberg, wife of the president of Wisconsin Power & Light Co. The *Badger* is the latest of four similar towboats designed and built by St. Louis Shipbuilding & Steel Co. for Midwest Towing Co. The first three were the *Arrowhead*, the *Prairie State*, and the *Hawkeye*.

The vessel's hull dimensions are 150 x 33½ x 11 ft., with normal draft of 7½ ft., and like her sister ships the hull is framed transversely & longitudinally, is heavily plated, with hull lines developed for best possible integration of Kort Nozzles and tunnels. Propulsion power is furnished by two model 16-567C diesel engines built by the Cleveland Diesel Engine Division of General Motors. Each is rated 1600 hp at 800 rpm. Through Falk reverse-reduction gears the 102 in. diameter propellers turn at 200 rpm. Airflex clutches and General Motors pilot house pneumatic controls provide quick, sure engine handling. Engine cooling water is circulated through a St. Louis Ship designed skin cooling system. Deck mounted oil bath air intake filters are provided for each engine.

St. Louis Ship hydraulic type steering systems are provided for the backing and steering rudders with mechanical follow-up controls. The position of the steering handles indicates precisely the position of the rudders at all times. Two General Motors diesels drive Delco generators and each provides 100 kw, 440 volt ac power for ship requirements and 20 kw - 120 volt dc for arc searchlights. The switchboard is designed for parallel operation of the generators with panels for 440 and 110 volt distribution. The well arranged engine room and auxiliary engine room provide easy access to all units. Stack exhaust fans and blower fans keep the areas comfortably ventilated. The

steering gear room is immediately aft of, and is accessible from the engine room, making it possible for the crew to service steering power and control units regularly and easily. The engine room is sound proofed and is provided with overhead trolleys, double doors, work bench, lathe, etc.

The *Badger's* deckhouse is arranged for maximum comfort and convenience of the crew with galley and mess adjacent to the engine-room and crew's quarters forward on the main deck. Officers' quarters are on the second deck. A deck locker opens onto the forward deck with a stair to a deck stores compartment in the hold. Living quarters are comfortably heated by a circulated hot water system with individually controlled convectors in each stateroom.

The pilot house is raised to locate the pilot's eye level over 30 ft. above water level. Specially designed, sloping, glareless windows are provided. Navigating equipment includes radar, radio, intercommunication and public address systems and rate of swing indicator. Engine and steering control handles are mounted in an efficient console which provides space also for electric searchlight controls and navigation light switches. Two 19 in., 45 amp arc searchlights are mounted, one each side of the pilot house below the pilot's eye level. An incandescent searchlight and a Kahlenberg T3 air whistle are located on the pilot house roof.

1600 shp GM Cleveland diesel in engine room of M/V *Badger* is equipped with Briggs filters and Marquette governor. DeLaval fuel oil centrifuge is used.

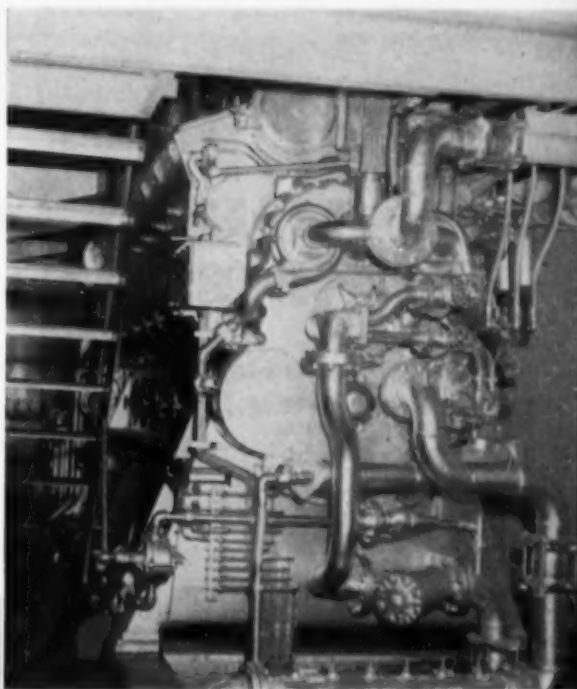
M/V *Badger* built for Midcontinent Barge Co. by St. Louis Ship is powered by two GM Cleveland diesels totalling 3200 hp. American Cycloil air filters and Burgess-Manning snubbers are shown on second deck.

The outstanding new *Badger* is a worthy addition to Midwest Towing Company's fine fleet.

## List of Principal Equipment

Engine .....	GM Cleveland Diesel
Reverse-reduction gear .....	Falk
Governor .....	Marquette
Lube oil filters .....	Briggs
Strainer .....	Cuno
Coolers .....	Ross
Thermostatic controls .....	Amot
Intake air filter .....	American
Muffler .....	Burgess-Manning
Fuel oil centrifuge .....	DeLaval Separator
Fuel oil transfer pump .....	Carver
Compressor .....	Quincy
Switchboard .....	General Electric
Auxiliary engine .....	GM Diesel
Auxiliary generator .....	Delco

21





Leece Neville alternator on this Hercules diesel is at left and Roosa Master fuel pump is in left center. ➤

◀ Dry-type Fram air cleaner for Hercules diesel in material handling unit is cleaned as part of Timken Company's preventive maintenance program.

## TIMKEN CONVERTS TO DIESELS AND SAVES

**Material Handling Department Started Switch To Lightweight High Speed Units in 1951; Now Has 43 Engines**

By FRANK C. WIER\*

**T**HE word "conversion" can be applied to a mental as well as a physical situation. In the case of the Steel and Tube Division of the Timken Roller Bearing Company's Material Handling Department, it can be said that both mental and physical aspects are valid. We think diesel engines are best for our work and we have made the physical change from gasoline to diesel-type units. Since a beginning in late 1951 all engines used on various material handling mobile equipment have been changed from gasoline to diesel-type. These changes have all been satisfactory and worth the doing from both an operating as well as an economic basis. The 43 diesel engines involved are all lightweight, high speed units manufactured by Hercules Motor Co., of Canton, Ohio, with dis-

placements ranging from 166 to 404 cu. in. (see table on this page).

Since the greatest number of units are involved in the DJXH and DWXDH models, we will deal in data accumulated from those engines; for the

same reason we have developed more information and have learned more about these two groups of engines. The DJXH engines are used in Clark-Ross Y200 fork lift trucks. These trucks have a capacity of 20,000 lbs. and are used in many different applications in our steel mill. Almost all are employed on a 24-hour-a-day basis and vary from five to seven days a week. The smoke problem in closed mill buildings is at a satisfactory minimum level. We think our preventive maintenance program is reasonably effective. Both the Y-200 fork lift trucks and the Clark-Ross series 95 straddle carriers, which use the DWXDH engines, are serviced at intervals of 150 to 175 hrs. of usage. At times the usage runs more than the 175-hr. limit but this is not allowed to happen repeatedly. Related to the engine, the service job consists of the following:

Engine oil is changed; engine oil filters are

**Diesel-Driven Material Handling Equipment Used by The Timken Company**

Equipment	Quantity	Hercules Model	Maximum Brake HP	Brake HP	Maximum Torque
Clark CY 40 Fork Lift Trucks	4	DD169 169	50 @ 2200	43.5 @ 1800 rpm	130 @ 1400 rpm
Baker 4000# Fork Lift Trucks	2	DIX4 166	57 @ 3000	40 @ 1800 rpm 51 @ 2400 rpm	91 @ 1300 rpm
Driving electric generators	3	DIX6 249	93 @ 3000	64 @ 1800 rpm 83 @ 2400 rpm	186 @ 1800 rpm
Clark-Ross Y200 Fork Lift Trucks	17	DJXH 298	99 @ 2600	79 @ 1800 rpm 96 @ 2400 rpm	234 @ 1400 rpm
Clark-Ross Series 95 Straddle Carriers	17	DWXDH 404	142 @ 2600	112 @ 1800 rpm 137 @ 2400 rpm	328 @ 1600 rpm

\*Superintendent-Materials, Steel & Tube Division  
The Timken Roller Bearing Co., Canton, Ohio.





gine installed in Unit No. 38 in November 1955 has logged 13,343 hrs. to date and is still running with time out only for preventive maintenance and regular servicing. The engine in No. 35 fork lift, also installed in November 1955, has run 12,363 hrs. with only a brief interruption last January to install a new dry-type air cleaner. Of the DWXDH engines installed in the series 95 straddle carriers, the one in unit No. 1 has registered 14,590 hrs. of repair-free service since its installation in September 1955. The engine in Unit No. 5 ran for 12,462 hrs., from June 1955 until October 1957, before major service was required. Nearly 11,000 hrs. was logged by the engine in unit No. 12 between September 1955 and January 1958. Unit No. 3's engine recorded 10,688 hrs. between February 1956 and April 1958.

The thermostats used in both the DJXH and the DWXDH will start to open at 172 degrees F. in a



A 404 cu. in. Hercules DWXDH diesel powers this Clark-Ross straddle carrier. Timken Company's Steel and Tube Division began to convert its material handling equipment to diesel engines in 1951.

changed; fuel filters are cleaned; air cleaner is serviced; fuel injection pump and governor lubricating oil is changed; adjustment of valve tappet clearance; fuel injectors checked for proper pressure and spray pattern; check water thermostat to insure proper engine heat; check water pump and cooling system; check proper tension of fuel pump drive chain and timing, etc.; general tightening of oil pan, engine side covers and replacement of gaskets as required; and adjustments to belts.

In March 1957 certain improvements were effected in the cooling system of the DJXH engine along with the universal installation of a giant size thermostat. Prior to this change it was hard to maintain proper temperature in a uniform pattern for all units. Long service of the DJXH's in the Timken Company's Y200 fork lifts is illustrated by the one in unit No. 28. This engine logged 16,117 hrs. between April 1954 and March 1957, when it was removed for reconditioning. The en-

free water test and be completely open from 180 to 185 degrees. We feel that temperatures in this range are the most important item in the successful operation of this type engine. Other important items are fuel of a cetane rating of 50 or higher, series 3 crankcase oil and good preventive maintenance all the time. Extra large oil filters of the waste or sock type are needed. It goes without saying that all engines must be kept clean. Until

the early part of 1958 we retained gasoline engines in three of our Series 95 straddle carriers. This was done to provide a bench mark against which to measure diesel performance. A wrecked carrier with diesel engine illustrated to everyone how extremely dangerous a gasoline-powered carrier could be in steel mill usage. As a result the remaining engines were promptly changed over to diesel service.

The records of the three gasoline-powered carriers during all of 1956 and 1957 afford a valid check with which to compare the performance against 11 diesels. In our experience the number of operating hours obtained by the expenditure of one mechanic manhour provides a fair and realistic gauge of performance. The following table shows the test results:

Number of Engines	Total Operating Hours
Gasoline 3	25666 operating hours 480 mechanic manhours Ratio 53.5 to 1
Diesel 11	99557 operating hours 774 mechanic manhours Ratio 128.6 to 1

This shows that gasoline engines required 2.4 times as much mechanical service as diesel engines. Gasoline engines used 2.46 gals. of fuel per hr. while the diesels used 1.5 gals. per hr. From this data it can readily be seen that diesel far out strips gasoline power in fuel consumption and also as related to downtime and frequency of same to an operating situation. We have not attempted to reduce all the cost comparisons which can be brought to bear between gasoline and diesel power



A 298 cu. in. Hercules DJXH engine was used to convert this Clark-Ross fork lift truck from gasoline to diesel service.

for the reason that the decrease in operation interruptions far overshadows any other cost factors.

It appears that conversion to diesel is satisfactory and desirable for mobile material handling equipment in steel mill applications. It is also highly recommended in other situations where dependability, long life, and sound engine economics are considered desirable.



# COMPACT BRUSHLESS AC GENERATORS FOR ENGINE DRIVE 10-150 KW

By C. M. BRYANT\*

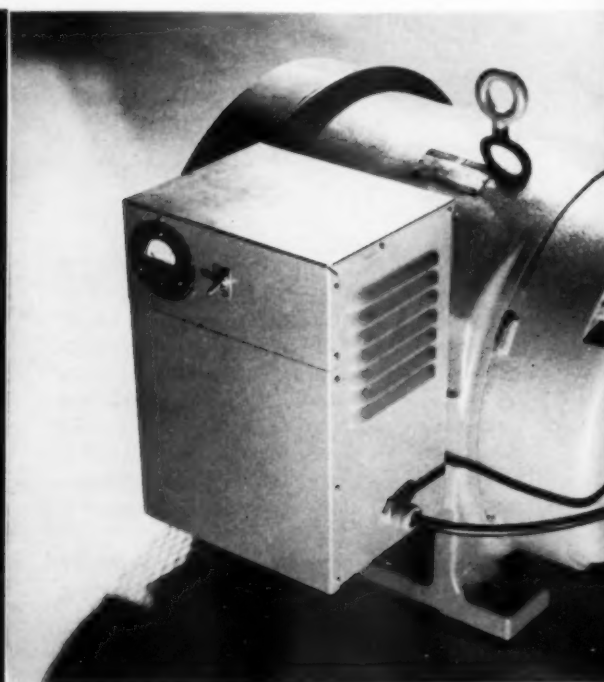
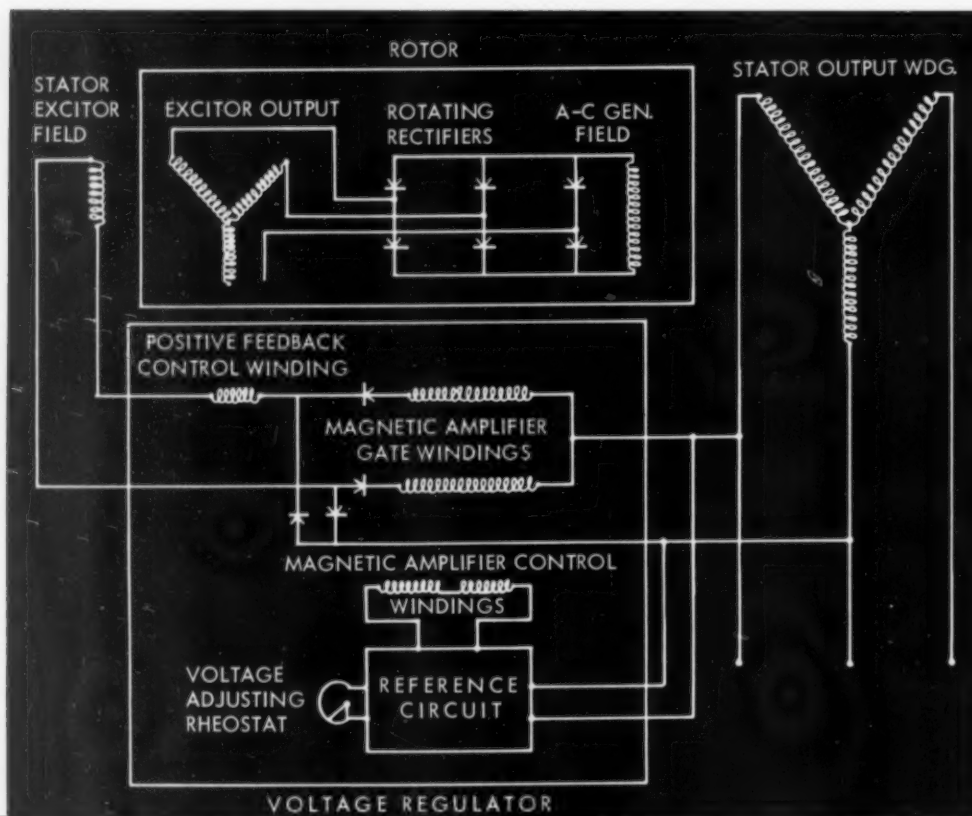
**B**RUSHLESS generators are now the standard line for General Electric in sizes of 10 through 150 kw at 60 cycles, 1800 rpm. Available for more than a year in sizes of 50-150 kw, ratings are now available from 10 kw thru 150 kw. These generators offer many advantages to engine-generator set builders as well as users of this equipment over previous General Electric models. For instance they are nearly 1000 lbs. lighter in some ratings than previous generators. In addition, they have been reduced in size by utilization of new insulating materials and design features, permitting savings in generator set bases and shipping costs, as well as simplifying installation for the user. Because the complete line of generators is brushless, they are suited for many applications where brush life and maintenance were previously a problem. Dusty, dry locations, such as those where power shovels and other types of construction equipment often work, present no problems with a brushless generator of this type.

The General Electric brushless generator consists of a salient pole ac generator with a direct connected

dc exciter. The exciter is overhung without bearings in 50-150 kw sizes and mounted inboard of the bearing in 10-40 kw sizes. The salient pole ac generator has a revolving dc excited field on the rotor and functionally is no different than salient pole generators of previous design. Each set of magnetic poles is formed by punching a salient or obvious set of poles out of thin sheets of steel, which are then stacked up to form the rotor. Each pole is wound with insulated wire, and a pair of poles (north and south) form the magnetic field which, when rotated, generates an ac voltage in the windings of the stationary structure or stator. New Class B insulation materials such as Mylar-micamat<sup>1</sup> and alkenex have been used. They give longer life at higher temperatures, thus allowing more output from the same size magnetic structure. The magnetic poles have been reshaped to permit the insertion of more copper or wire on each pole; this increases the magnetic field and generates more output from the same magnetic structure. Through design improvements in the ventilation of the field windings and the addition of two more fans, more heat can be dissipated from the generator, thus reducing size by permitting higher currents in both rotor and stator.

*1. Registered trademark of DuPont Co.*

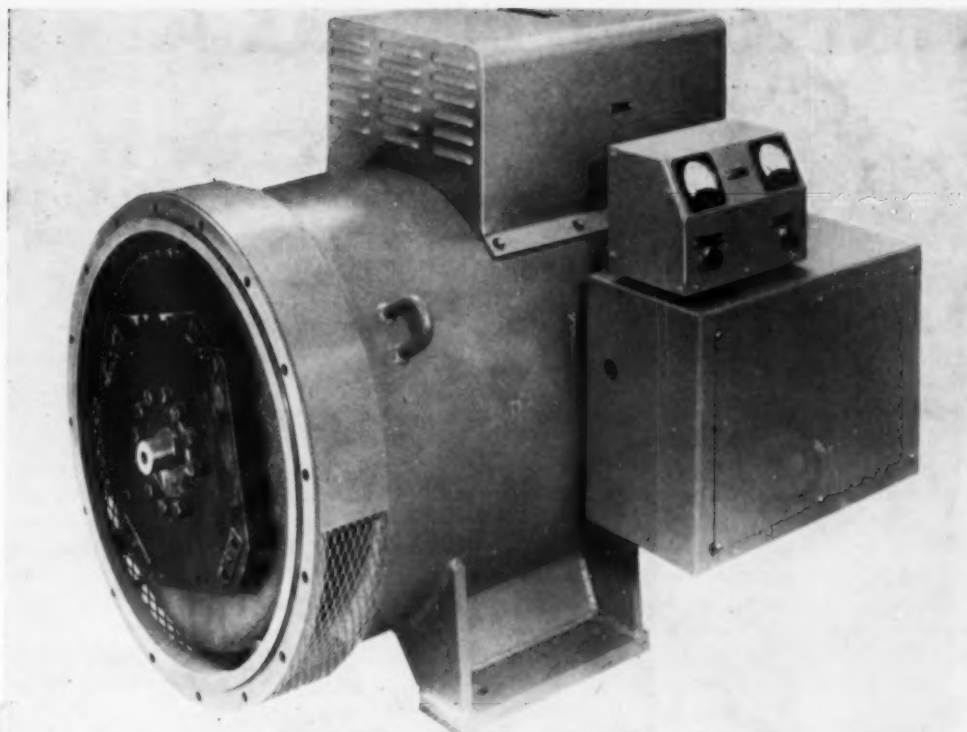
The exciter which furnishes the dc power to the windings of the ac generator differs only mechanically from a conventional exciter which has been in common use on ac generators for many years. The conventional dc exciter is an ac generator in which the output is converted to direct current by use of a mechanical rectifier, namely the commutator, and its associated brushes. After the rectification has taken place, the dc power is then available on the stationary part of the machine at the brushes of the commutator. Slip rings and another set of brushes are needed to channel this dc power back to the rotating part of the ac generator (the field winding). On a brushless generator the rectification of the power from the exciter is done through silicon rectifiers (sometimes called diodes or transistors). These rectifying elements are mounted on the rotor of the exciter and connected to the output windings of the exciter (these output windings were previously connected to commutator segments and their number has been reduced to three as in a three-phase ac generator). Because the rectification takes place on the rotor, it need only be connected through two wires to the field windings of the ac generators. No slip rings are needed to connect it back into the rotor again. Electrically, the General Electric brushless ac generator is very similar



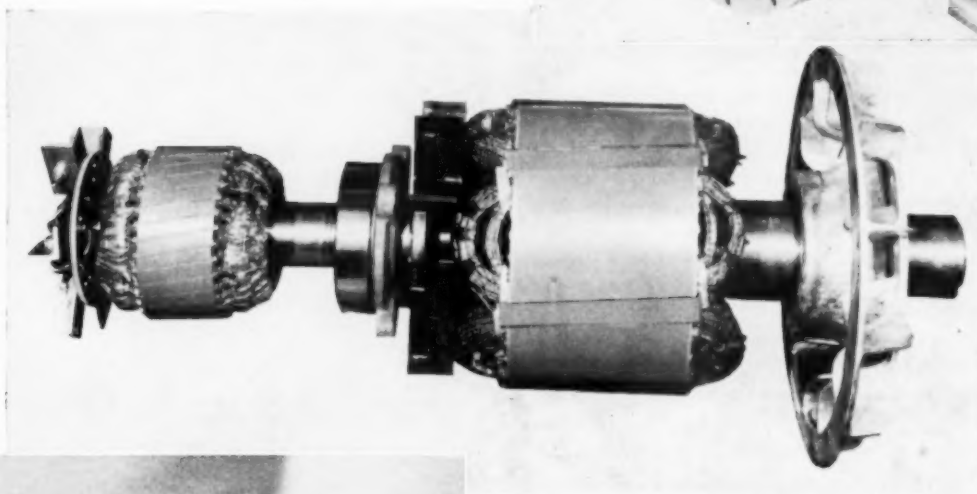
◀ Schematic diagram of General Electric brushless generator and static voltage regulator.

to previous designs. The mechanical innovations, such as silicon rectifiers, improvements in ventilation and insulation systems, are different.

Versatility is an important feature of these brushless generators. They have been designed to operate over a wide range 208 to 240 volts on the low voltage connection and 416 to 480 volts on the high voltage connection. At 208 volts, 3 phase, 120 line-to-neutral is available for 208 volt network systems. The standard generator may be operated at 50 cycles at 5/6 of the 60 cycle kw rating and with voltages of 115/200 or 230/400, 4-wire. Because 12 leads are available, the generators may be connected delta for single-phase operation to give 120/240 volts single-phase at 2/4 of the three-phase rating. All generators are equipped with static magnetic amplifier voltage regulators either for separate mounting or to mount on the generator as a control package. The control package is available with voltage regulator, combination voltmeter, ammeter, frequency meter and elapsed time meter. The generators can be operated in parallel when provided with reactive



This ac brushless synchronous generator is typical of General Electric static-excited and regulated 175-200 kw at 1800 rpm and 125-250 kw at 1200.



View of rotor of TC/55 showing ac generator, exciter, three fans and mounting of silicon exciter rectifiers on exciter fan.



This TC/55 brushless ac generator for engine drive has single bearing with side-mounted control containing static voltage regulator and combination voltmeter-ammeter and selector switch.

droop compensation, which is available as a modification. The voltage regulator and control equipment are factory tested with the generator to eliminate the problem of matching the generator and voltage regulator and assure satisfactory system operation when the unit leaves the factory.

To simplify installation on the engine, a series of adapters and disk-type flexible couplings are available to fit SAE flywheel housings in sizes of SAE 3 thru 00. The adapter can be changed to a different size in the field easily should it become necessary because of a change in engine flywheel housing dimensions. In addition to many applications on emergency-power, engine generator sets, these generators have been used in military applications, on oil well drilling rigs, in marine service, on construction equipment and on mechanically refrigerated railway cars.

Large motor starting capacity is another of the built-in features which make the generator as versatile as possible. For applications where power

is to be supplied to large motors, motors in sizes of 0.5 hp per generator kilowatt (50 hp on a 100 kw generator) may be started and under some conditions motors of up to 1.0 hp/kw (100 hp on a 100 kw generator) may be operated from the generators. Since induction motors draw 5 to 6 kva/hp when started (500 to 600 kva for a 100 hp motor), this represents a substantial load to start on a relatively small generator. Because of the rapid response of the magnetic amplifier voltage regulator and the high ceiling of the brushless exciter, the generators recover very rapidly with changes in load. Because of the high sensitivity of the voltage regulator, the voltage regulation from no-load to full-load is held to plus or minus two per cent of rated voltage. Modifications are available to the regulator which make possible voltage regulation of plus or minus one per cent from no-load to full-load.

To complement the line of brushless ac generators in sizes of 10 through 150 kw, a completely packaged line of General Electric static excited and regulated ac generators is available in sizes of 175 through 300 kw at 1800 rpm and 150 through 250 kw at 1200 rpm. These generators utilize the same basic magnetic amplifier voltage regulator circuitry, but the rotating exciter is eliminated and excitation power is fed directly to the ac generator rotating field thru slip rings. These static-excited generators incorporate many versatility features, including wide voltage range, and are equipped with adapters and flexible couplings for mounting on standard SAE engine flywheel housings. The static exciter voltage regulator is mounted on the generator and is factory tested with the generator. The same basic control features are available—voltmeter, ammeter, frequency meter and elapsed time meter.



# FUNCTIONAL RIG HANDLES DEEP DRILLING

**Three Waukesha Diesels Provide Total of 1875 hp  
To Power Continental Marine Exploration's Platform in Gulf;  
Even Guard Rails Carry Water and Fuel Oil**

By DONALD M. TAYLOR

**A** ONE-WORD description of Continental Marine Exploration Company's Rig 12 is . . . functional. The drilling platform was designed for deep drilling in the shallow waters of the Gulf of Mexico, and every nut, bolt and piece of pipe on it contributes toward this purpose. A casual visitor to the rig usually is made aware of the extent of this functionalism when he leans over the guard rail in typical landlubber fashion. He then is casually told that he is resting his elbows on a water supply line and his foot on a fuel gas line. The stanchions that support the combination guard rails and auxiliary lines are fuel and water headers.

Unlike most offshore rigs, Rig 12 has few frills; its design is simple. It is mounted on a 230 x 75 ft. submersible barge which floats it from location to location and rests on the Gulf bottom during drilling operations. The substructure supports the first deck 54 ft. above the top of the barge, and the drilling deck 65 ft. above it. Composed mainly of steel pipe members, the substructure was designed to withstand 125 mph winds and the pounding of 38 ft. waves. The rig already has ridden out three

hurricanes, including the infamous Audrey which wiped out the coastal village of Cameron, La.

Aside from this ruggedness, the rig has other features which spell the difference between profit and loss in drilling. Among them is the selection of engines. The main power package on the rig includes three VLRDBU Waukesha diesel engines which develop 625 hp at 1000 rpm. These units can be used singly or in compound, and their size is such that a combination of the engines provides adequate power for every drilling operation. Sizing and handling of engine horsepower have more to do with a rig's capability than almost any other factor. To illustrate, oversimplify a bit. A drilling rig has three basic functions. First, it hoists pipe in or out of the hole. The rated depth of any drilling rig is primarily based on how much pipe it will hoist. The components of this hoist are derrick, crown block, traveling block, hook and drawworks. The drawworks spools the drill line in or out, lifting or lowering the traveling block, which in turn lifts the drill pipe in single joints or in a string.

The second basic function is to circulate drilling fluid—mud, water or other—down the drill pipe, out the eyes of the bit and back up the hole on the outside of the drill pipe. Some of the components

of this system are mud pumps, mud pits, piping and rotary hose.

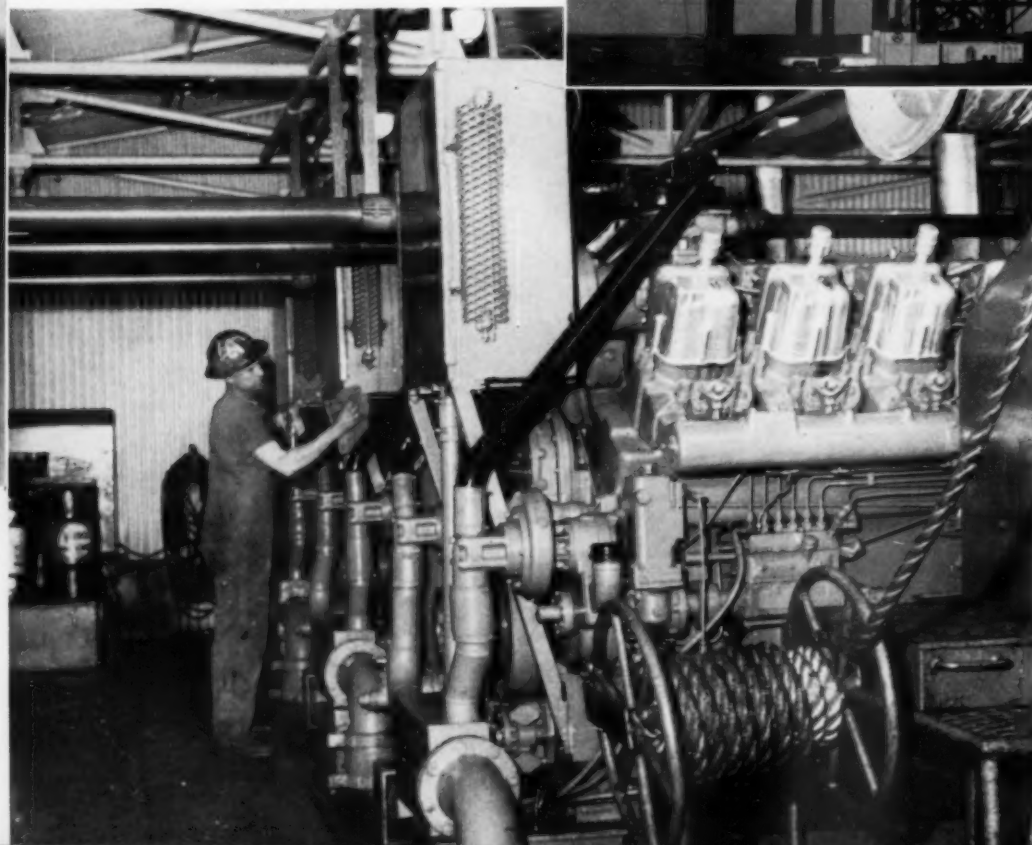
The rig's third basic function is to rotate the drill



◀ This seems like an ordinary guard rail on a vessel at sea, but the top rail carries water; the bottom, fuel oil.



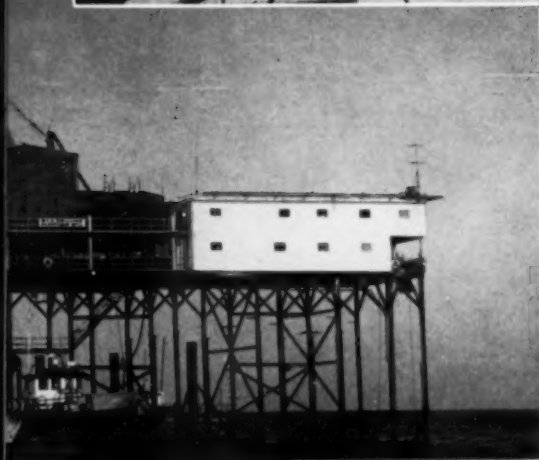
▶ The three VLRDBU Waukesha Diesel engines which develop 625 hp each at 1000 rpm. In an emergency, engines develop 800 hp each. Note the absence of radiators. The jacket water is cooled by exchanging heat with sea water in special heat exchangers. Note American Bosch fuel pump and Woodward governor.





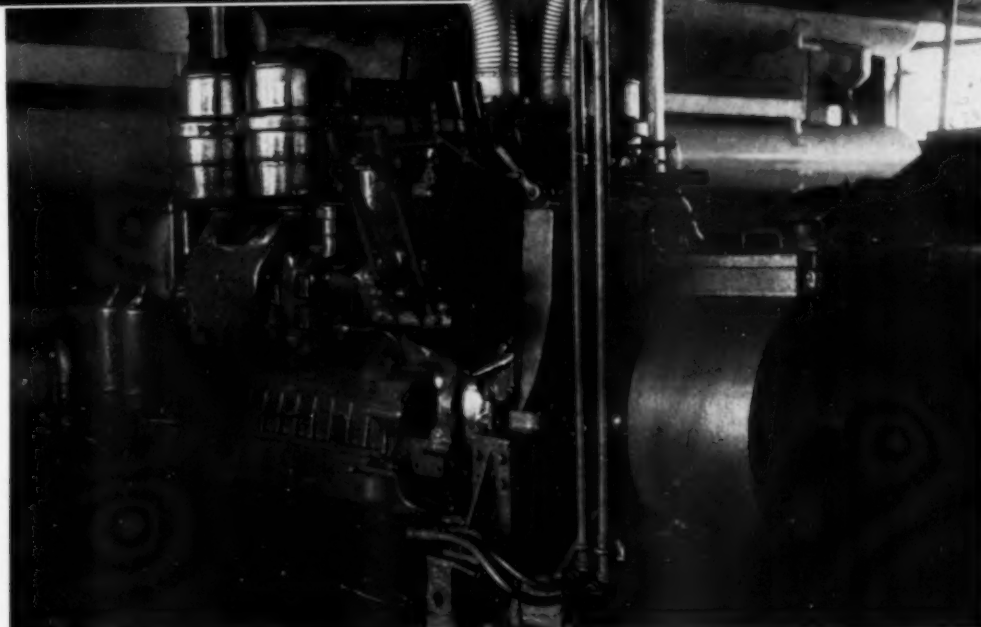


A helicopter hovers over the 142 ft. drilling mast. Helicopters provide safe, fast means of transportation. ➡



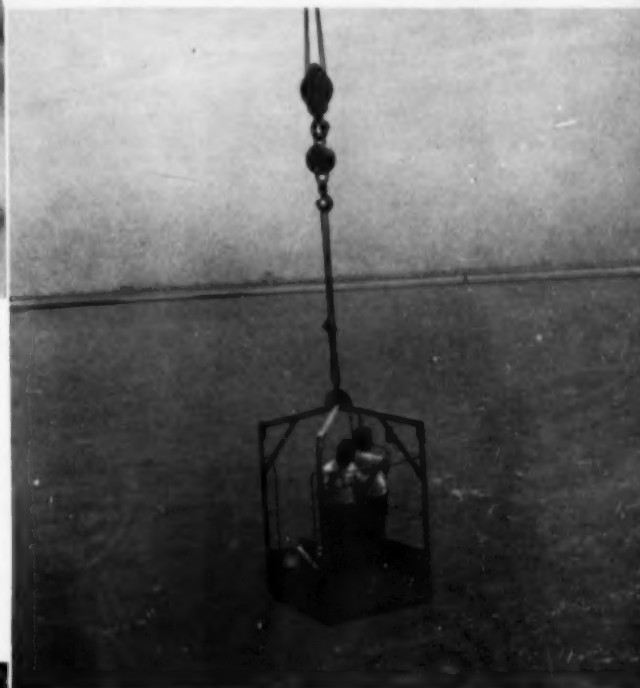
◀ Continental Marine Exploration Company's Rig 12 is drilling in Galveston Bay off the Texas coast. Rig 12 is capable of drilling in waters up to 35 ft. in depth; it will drill as deep as 22,500 ft.

Mud mixing pump is on the second deck. This pump is powered by twin GM diesels model 12103 HD rated 300 hp each. ➡



bit on the bottom of the hole through the string of drill and drill collars in the hole. This is effected through an angle drive called the rotary table. Components of this drive are the kelly—which may be square, hexagonal or another shape—and the drive bushings that transmit the rotation from the rotary table to the drill string. Despite the friction which may be inherent in the long strings of pipe, the horsepower requirements for rotation are small compared with the requirements for the drawworks and the pump. For this reason, Comar chose a separate engine for this service; a GM 12107 with a torque converter.

Summing up, power needed by a drilling rig is based on its hoisting, mud circulating and rotary table requirements. The hoisting and circulating requirements do not coincide. When the pipe is on the bottom and drilling, the pump requirements may be great, but the drawworks require-



➡ This "bird-cage" provides a means of depositing personnel from the rig to a lower barge, from which they can step into a waiting boat.

ments will be negligible. When the pipe is being withdrawn from the hole (tripping out), the drawworks requirements will be great, but the mud pumps will not be needed. This indicates the advantage to be gained by using the same engine set-up for the drawworks and the mud pumps. To power its Wilson Super Titan 66 drawworks, Comar chose the three compounded Waukesha VLRDBU's. GM 12103 HD twin 300 hp diesels drive the mud-mixing pump. Two GM 6-71's drive Stewart and Stevenson 150 kw generators, which furnish power for lights, electric hoists, air conditioning of crew quarters, cooking and mud hoisting and mixing equipment. Centrifugal ballast pumps raise the rig off the Gulf bottom. They are powered by a submersible electric motor. The rig can be raised in about four hours. The barge was towed to its present location off the Galveston (Texas) jetties from Houma, La., at a speed of 10 mph. The trip required 32 hours.

# EXCAVATING CANAL 19

By L. H. HOUCK

**A** 480-W Bucyrus-Erie walking dragline with a 935 hp Cooper-Bessemer diesel, is making excavating history in the muddy gumbo of the Mississippi lowlands near Gould, Ark., by swinging 16 cu. yds. at the rate of more than one per minute. Operating at this pace 18,000 cu. yds. is excavated each 24 hours and the drag line is working day and night, seven days per week.

The swing recorder tape on this machine, built especially for Kenyon Construction Corp., Port Allen, La., at a cost of more than \$800,000, shows five to seven swings per five-minute interval on maximum swings of the 160 ft. boom and up to eight on short swings. This is not fair weather production but an outstanding example of big dieselized equipment at full production through shut-down weather. These were normal production records established in this tough winter season when the weather man threw the book at the job with torrential rains, tornadoes and freezing temperatures. Working at times as much as three miles from the highway, operating crews were often transported in belt-track weasels and 4 wheel drive trucks across water-soaked gumbo rice land.

Thumbing a figurative nose at the weather, the 750 ton machine, perched on the dozed-off top of an old canal spoil bank, demonstrated conclusively that it could dig through a 24-hour 6 in. torrential rain without interruption—and better yet, walk, under the same conditions without expensive, time-consuming mat laying. This was the situation on Canal 19 when it was visited by Diesel

Jesse Prewitt, Kenyon superintendent, checking swing record tape, which shows more than a swing per minute.



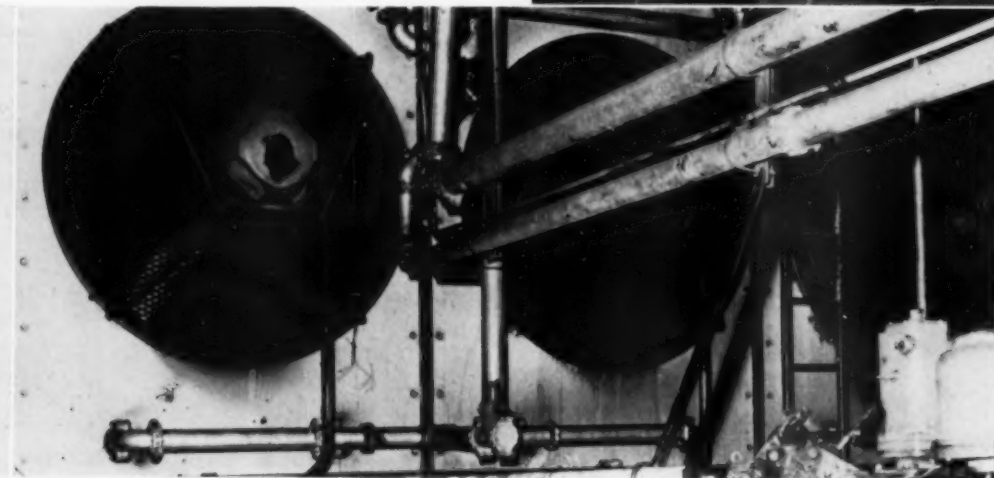
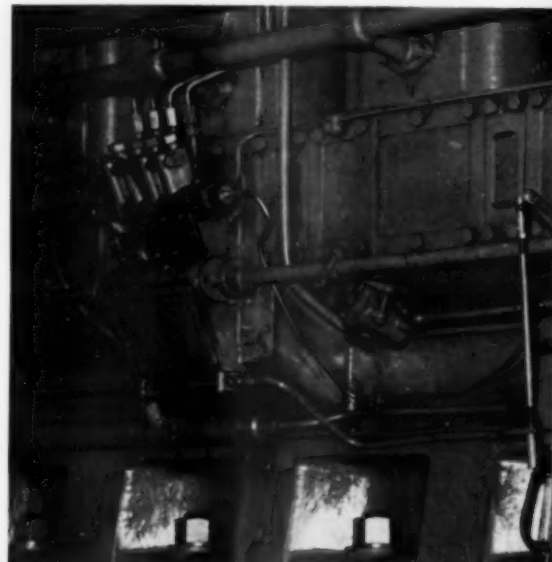
Progress twice, in January and March of this year. This is Contract No. DA-22-052-CIVENG-58-427, Corps of Engineers, U. S. Army, Vicksburg District, Vicksburg, Miss., awarded to Kenyon Dredging Corp., Port Allen, La., on March 10, 1958 for \$357,200 and sublet to the Kenyon Dredging Corp. The project is 20.9 miles long and involves 4,700,000 cu. yds. of water-filled gumbo, in the enlargement and extension of Canal 19 between Pine Bluff and Tillar, Ark. This is an important part of a huge Corps of Engineers drainage project authorized by Congress in Acts passed in 1944, 1946 and 1958, costing approximately \$21,700,000. Authorized improvements consist of 853 miles in an area 190 miles long and about 30 miles wide. More than half of this job has been completed with \$13,554,000 expended by July 1, 1958 and Army Engineers are rapidly wrapping up the last half to restore thousands of acres of valuable land.

If the construction job involved is big, then the ultimate results are even larger. Flood control and drainage benefits will be provided for 896,000 acres of valuable agricultural land, of which 293,000 acres have been cleared and 275,000 acres are to be cleared in the future. An annual toll of flood damage amounting to \$648,000 a year will be saved. Cleared land will produce an estimated \$2,753,000 annual crop. Land yet to be cleared will produce an estimated crop by reason of drainage and flood control, of \$2,430,000. Certainly big returns in a region historically plagued with recurring floods from the Mississippi, the Arkansas, the

that long to build. The dragline was shipped to Tillar, Ark., on 37 freight cars. It was assembled there and walked under its own power the three miles to the site of Canal 19. It is equipped with a 160 ft. boom and swings a 14 cu. yd. or a 16 cu. yd. bucket. The job consists of new slopes and bottom for existing Canal 19 with 1 on 2 side slopes cut by the dragline without revision. The bottom was 90 ft. at Tillar, followed by 8.6 miles with a 70-ft. bottom and an upper 5.9 miles with a 30-ft. bottom. Spoil was dumped on the old bank as the walker progressed up stream in 8 ft. steps.

The Cooper-Bessemer diesel powering the B-E 480-W is a model JS-8, a naturally aspirated engine of eight cylinders, 15½ in. x 22 in. normally rated

Interior view of rear of dragline engine room showing Young radiators, two for water and one for lube oil. Center pipe "T" is an Amot thermostat temperature control.

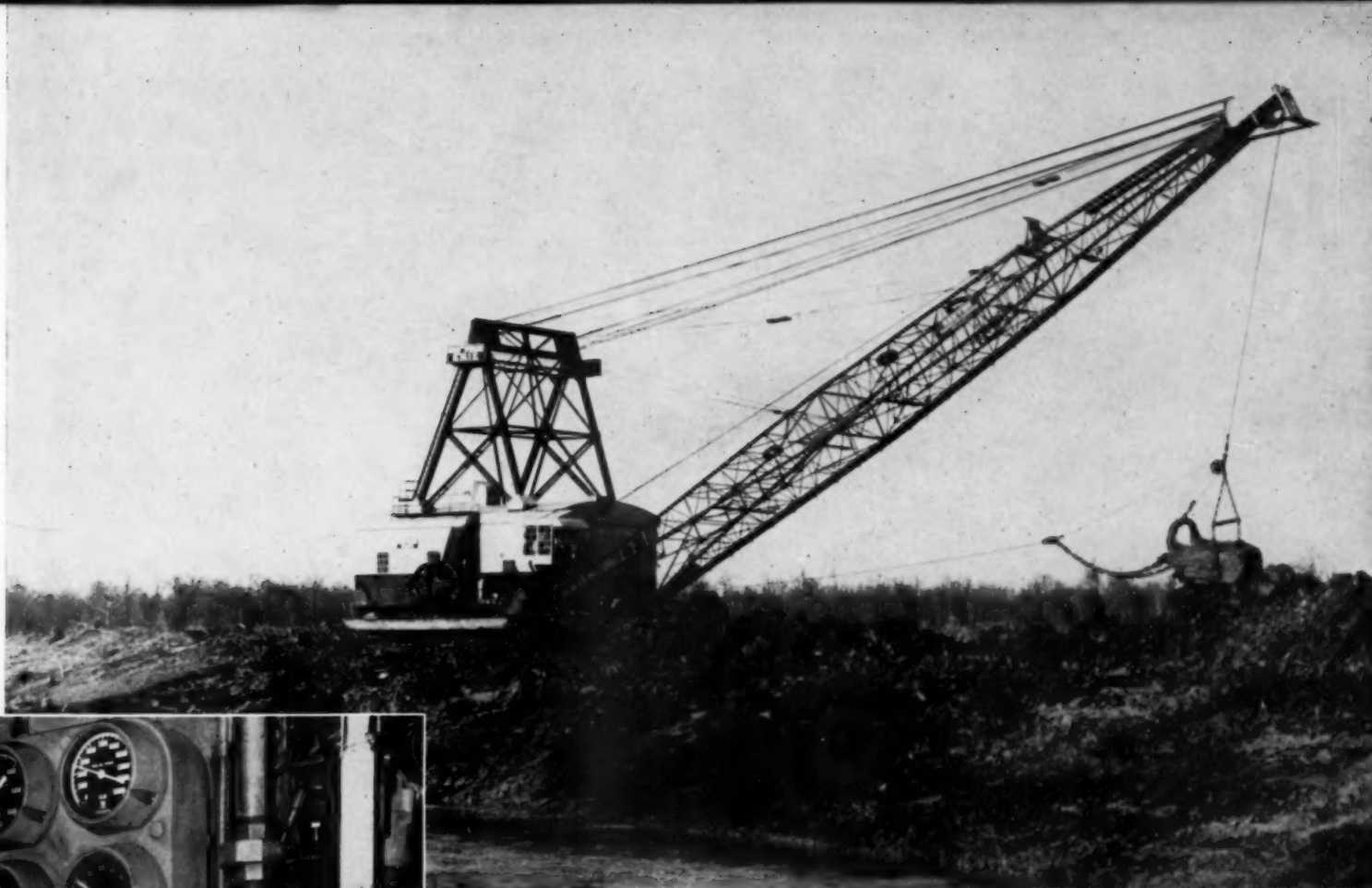


Ouachita, Red and other rivers in the 5300 sq. mile area of the alluvial valley of the Mississippi River between Pine Bluff, Ark., and Jonesville, La.

Kenyon Construction Corp., a subsidiary of the Kenyon Dredging Corp., an experienced contractor in the delta region, ordered the 480-W two years prior to contract granting since it required

935 hp at 514 rpm. The hoist and drag drums are driven through a Bucyrus-Erie direct-connected transmission and clutch. Control is electric over air in which solenoids operate valves controlling air on hoist, drag, brake and walking device. A 250-volt, 340 ampere General Electric generator is driven from the crankshaft of the Cooper-Bessemer by 14 v-belts. The generator has a 125-volt,



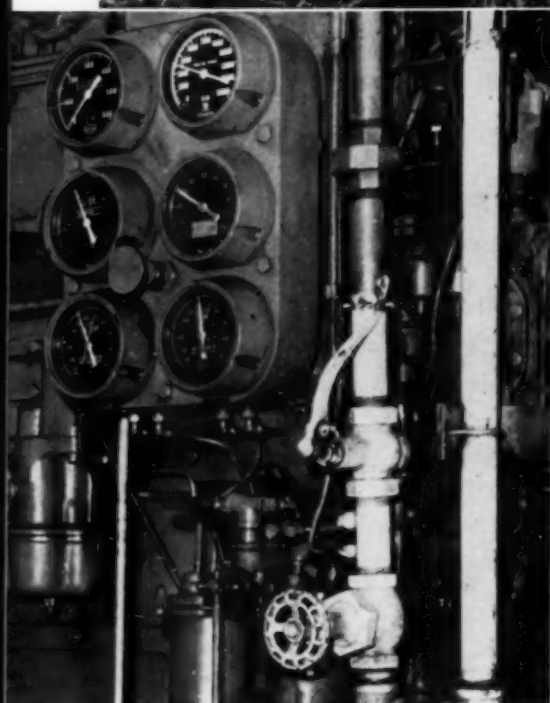


480-W Bucyrus-Erie 16 cu. yd. dragline. Bucket looks deceptively small under the 160 ft. boom.

935 hp Cooper-Bessemer diesel and its gauge panel. To right is Fulton-Sylphon automatic control and below it, the Nugent fuel filters.

16-cu. yd. dragline bucket as seen by the 480-W operator. Far background member of engineer party checks depth and slopes.

Canal 19 project is under supervision of Col. M. Barschdorf, District Engineer, U. S. Army Engineer District, Vicksburg, Miss. Col. Barschdorf is a West Point graduate and has a masters degree in Civil Engineering from M. I. T.



480 ampere exciter. The swing on the 480-W is electric, using a GE motor but the main drive is direct from the engine.

The contract allowed 750 days for completion of the job and it was well six months ahead of schedule when visited by Diesel Progress. The job is under the supervision of Corps of Engineers, U. S. Army, Vicksburg District, of which Col. M. Barschdorf is District Engineer. Mr. Howard Kenyon, Jr., is president of Kenyon Construction Corp., Port Allen, La., and Jesse Prewitt is general superintendent on the Canal 19 job. Kenyon engineer is Fred Tomlinson. Preliminary clearing prior to moving in the big dragline was also handled by Kenyon, using two Allis-Chalmers tractors and a 71-B Bucyrus-Erie 3½ cu. yd. dragline with a General Motors 6-110 diesel engine, and boomed from 90 to 110 ft.

Trees were cut by hand labor and chain saws. An Allis-Chalmers HD-16 diesel tractor with Twin



Disc torque converter was equipped with a cutting blade and handled clean up. Another Allis-Chalmers tractor, an HD-21 equipped with the new 21,000 diesel and Twin-Disc converter, was used to doze off a path ahead of the 480-W.

#### Principal Equipment Listing

Engine	Cooper-Bessemer
Generator	General Electric
Governor	Woodward
Pyrometer	Alnor
Thermostatic control	Amot
Air compressor	Gardner-Denver
Safety control	Fulton-Sylphon
Radiators and heat exchangers	Young
Air cleaner	Air Maze
Fuel oil strainer	Purolator
Fuel oil filter	Nugent
Lube oil filter	Cuno
Fuel oil	Texaco
Lube oil	Sinclair







## DIESEL FLEET FOR SUBMARINE PIPELINER

By RUEL McDANIEL

**D**IVERSATILITY is an outstanding feature of the 87 ft. motorship *Jean E* which heads up a new fleet for Collins Construction Co., Port Lavaca, Tex. Although based in a small city in Texas, the concern does a world-wide business of laying submarine pipelines. The new fleet was constructed at this particular time to fill the need for a major pipe-laying job in the Persian Gulf. Obviously it will become a part of the company's specialized equipment for submarine pipe-laying throughout the world.

The *Jean E* is the largest of four diesel-propelled craft and four steel barges constructed for the Collins organization. It was built by E. W. & A. P. Dupont, Inc., Patterson, La. The *Jean E* has a beam of 22 ft. and a draft of 11 ft. Her main power comes from twin 6-110 General Motors 300 hp diesel engines turning Michigan 52x38 in. propellers through a 4.5 hydraulic gear. Auxiliary power comes from two GM 2-71, 30 kw diesel generator sets. The craft was built to serve as a combination tug, supply boat and quarter boat, as specific pipe-laying jobs dictate. She contains quarters for 14 men and galley facilities for a like number. The yard utilized only 45 days from keel-laying to delivery.

The second largest unit in the new pipe-laying fleet is the tug, *Billie V*. She is 65 ft. long and has a 20 ft. beam and carries the same power and two 20 kw GM auxiliaries as the *Jean E*, except there is no automatic pilot. She also was built by Dupont. The *Pat H* is a 54 ft. crew boat, with the



same power as the two foregoing craft. She was built by Equitable Equipment Co., New Orleans. Fourth of the boats is the *Ella B*, a 37½ ft. crew

boat, built by Breau's Bay Craft, Inc., Loreauville, La. She is powered by two 6-71 GM diesels. These engines, as well as those for the other three

vessels, were supplied by Stewart & Stevenson Services in Houston.

Of the four flush-deck steel barges built for Collins, the largest is 200 ft. x 45 ft. x 10 ft. The other smaller barge was constructed by Equitable at the Madisonville (Louisiana) yard. The fleet assembled

Welded pipe sections and floats in launching area for laying across the Straits of Mackinac. Pipe was buried in 250 ft. of water.



Largest of the four diesel vessels built for the Texas based Collins Construction Co., is the *Jean E.* Craft is a combination tug, supply boat and quarter boat.

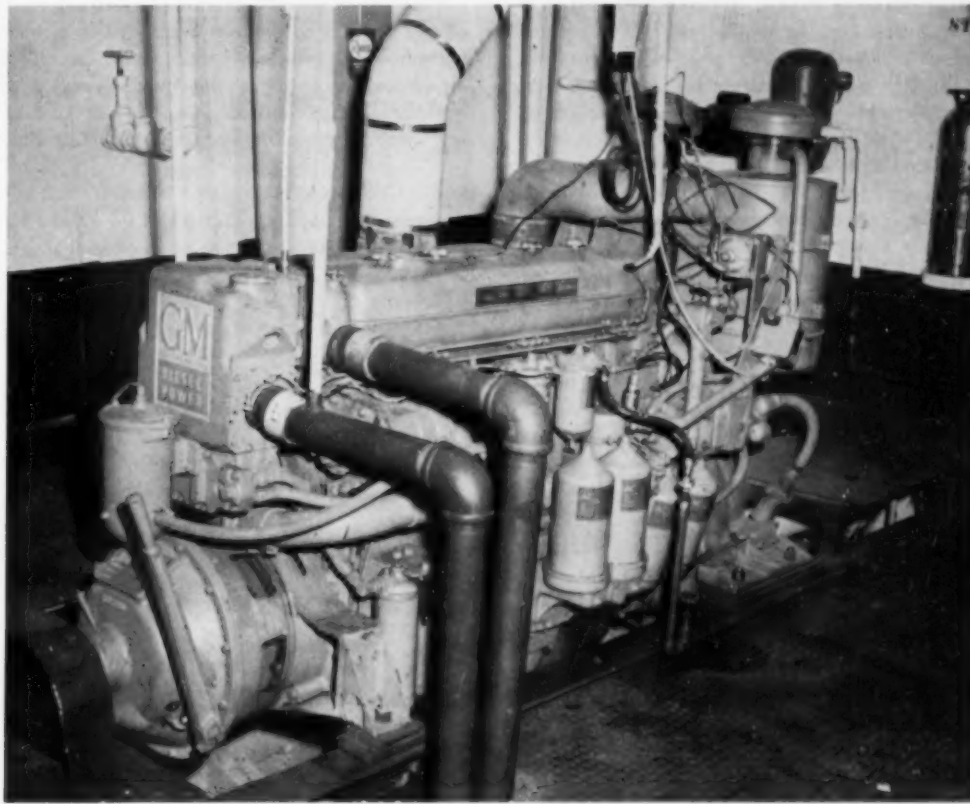
*Billy V* is powered by twin GM-110, 300 hp engines.

at New Orleans for the trip to the Persian Gulf. The *Jean E* sailed under her own power, while the three smaller boats were transported on the decks of the barges. A Dutch towing concern handled the transportation job. The barges also hauled four skid-mounted quarters buildings for use on the Persian Gulf work-site.

Mr. Sam Collins, with 15 years of diversified oil industry experience, started the business in 1948. Oil and gas pipelines had been restricted in their expansion because no way had been found to string them across deep bodies of waters and fast-running rivers. Young Collins bravely declared that he had a way of overcoming this major pipe-laying problem. And quite unexpectedly he had an opportunity to prove it. Aluminum Company of America had built an electrolytic reduction plant

near Port Lavaca, and to fuel its Nordberg gas engine power plant, as much natural gas as needed by a city of 50,000 would be utilized, and this gas must come from company and franchised wells in the area. Several of them were in Matagorda Bay. The company had to have underwater pipelines to transport the gas from many of these wells to the plant. The company called for bids on the pipe-laying job—completion to be within 90 days of awarding the contract. None of the regular pipeline contractors would touch the job. Collins got

6 and 8 lbs./ft. in the water and buoyed by the air-filled floats. Thus it is possible to pull even thousands of feet of pipe through a body of water. To pull the pipe, the Collins organization improvised powerful winches, the larger of the two capable of pulling 1,320,000 lbs. of buoyed pipe. By use of this special equipment and the Collins know-how, some spectacular underwater pipeline jobs have been accomplished, such as the one crossing the treacherous Straits of Mackinac, connecting Lake Huron and Lake Michigan.



Engine room of the *Jean E.* 300 hp GM engines drive through a 4.5:1 hydraulic clutch. Note twin Donaldson oil bath air cleaners.

it. Sammy Collins put into use some of his own patented equipment, he improvised right and left, and he delivered the job in 24 days. It launched him into the submarine pipeline business, with an enviable reputation from the start.

On this initial job he utilized a trenching machine which he had perfected and invented. Its use enabled him to dig an 18 in. trench, haul the pipe into place and cover it virtually in a single operation. He has so perfected the machine until today it is possible to dig a trench of any given depth in water as deep as 2,500 ft., lay pipe and cover it. By use of a special pipeline "cradle" which he perfected, Collins can weld and assemble a lengthy string of pipe ashore, pull it into the water, dig the trench and lay the pipe in lengths limited only by the area available for welding and assembling it. It is possible to pull thousands of feet of steel pipe into and through the water by use of still another system perfected by Collins—a series of metal floats, air-filled to provide the desired buoyancy, and affixed to the pipe at given intervals. These floats reduce the weight of 24 in. pipe from 561 lbs./ft. to between

This was buried in 250 ft. of water and at that time was reported to be the deepest submarine pipeline in the world.

An earlier and spectacular job which gained the Collins organization international recognition was the laying of a pipeline across the Narrows, between Staten Island and Brooklyn. In 1954 the company laid a 12 in. sea-loading line two miles into the Atlantic off the Gold Coast Colony (now Ghana) in West Africa for Socony-Vacuum Oil Company in conjunction with Taylor-Woodrow, Ltd., general contractor, of London. In 1957 the company completed another similar job in this area. The concern added to its international reputation with a job of laying 90,000 ft. of pipeline from Pir Pau, on the mainland of India, to Butcher Island in the Bay of Bombay. Other jobs have been performed since for the Indian government. And now the acquisition of this new fleet adds still another step in the development of this international submarine pipe-laying outfit with jobs in the works in a half-dozen remote areas of the world. Sammy Collins needed the fleet. What Sammy Collins needs, he buys, invents or builds.



# CHRYSLER WILL MARKET DEUTZ AIR-COOLED DIESELS

By J. W. BROWN

**T**HE Marine and Industrial Engine Division of the Chrysler Corp. has announced plans to market German-built Deutz diesel engines in this country just as soon as distribution and servicing facilities can be finalized. Mr. L. E. Nelson, the division's vice-president of sales, said that the decision to market the Deutz Engine was reached after a careful review of several foreign makes of diesel engines available for distribution here. Chrysler's decision was influenced in part by the advantages of the unique Deutz air-cooling system. The decision was reinforced by the fact that the spread of horsepower in the current and projected Deutz line seemed to fit the requirements of United States industrial applications.

The Klockner-Humboldt-Deutz engine factory at Cologne, Germany, claims to be the world leader in the production of diesel horsepower and second to England's Perkins, Ltd., in total number of diesel engines produced. Deutz, whose long, interesting history of engine building began in 1864, produces both two and four-cycle, water-cooled and air-cooled, naturally aspirated and turbocharged diesel engines in a range of from 3 to 3000 bhp. Although Chrysler is observing with interest a new series of water-cooled in-line and V-type liquid-cooled engines ranging from 100 to 600 bhp (now being developed), it currently plans to restrict its imports to the air-cooled engines. These range from a one-cylinder 9 bhp (continuous) model to a turbocharged V-12 engine of 300 bhp maximum industrial rating.

Although the Cologne plant was building heat engines as early as 1864, it also built the first 4-stroke internal combustion engine in 1876. The

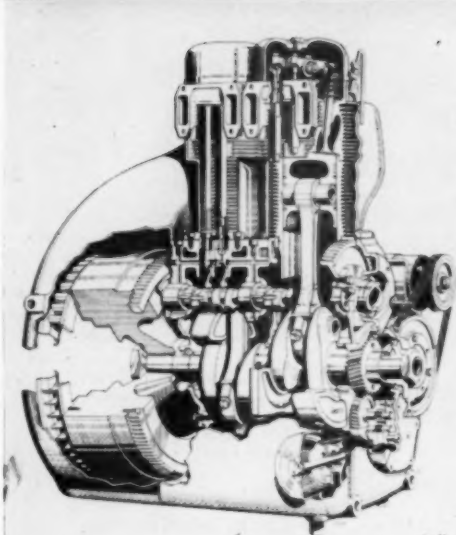
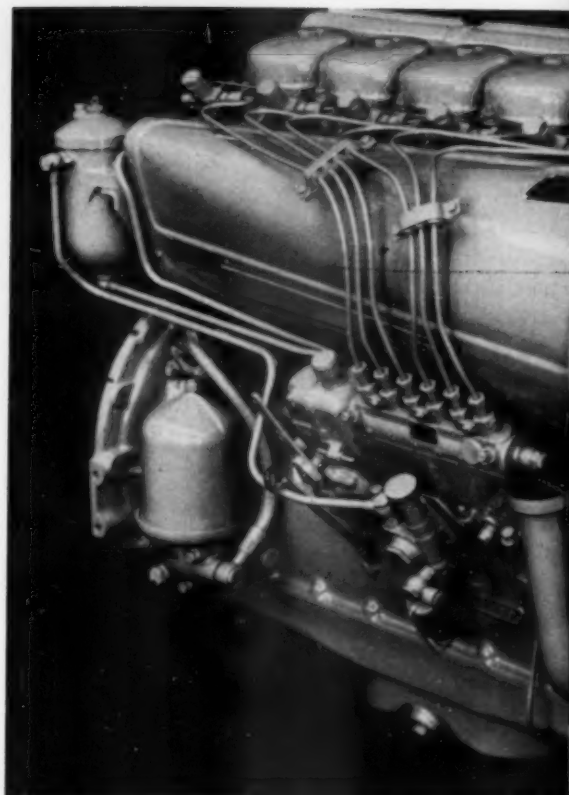
plant was founded by N. A. Otto (originator of the Otto cycle) and Eugen Langen. They are credited with the invention of the internal combustion engine as known today. Deutz has a big export business in both air-cooled and liquid-cooled engines for marine and industrial service. Deutz air-cooled diesel engines power a wide variety of OEM equipment in the construction, petroleum, lumbering, mining, transportation and other industries.

Deutz engines which Chrysler will market include the series 712, 514-614 and 714 air-cooled industrial units of 52, 81 and 96 cu. in. displacement per cylinder, respectively. The smallest series, the 712, includes, 1, 2, 3, 4 and 6-cylinder inline engines. The 514 series has 2, 3, 4 and 6-cylinder inline engines. The 6, 8 and 12-cylinder 614 and 714 engines are all V-type. Because the 514 inline and 614 V-type engines have the same bore and stroke, Deutz considers them as one series. The V-12 engines of the 614 and 714 series are available with turbocharging, with a conservative boost in maximum hp output. A chart accompanying this article shows the continuous and maximum horsepowers obtainable from 17 different models in the four series which Chrysler plans to market.

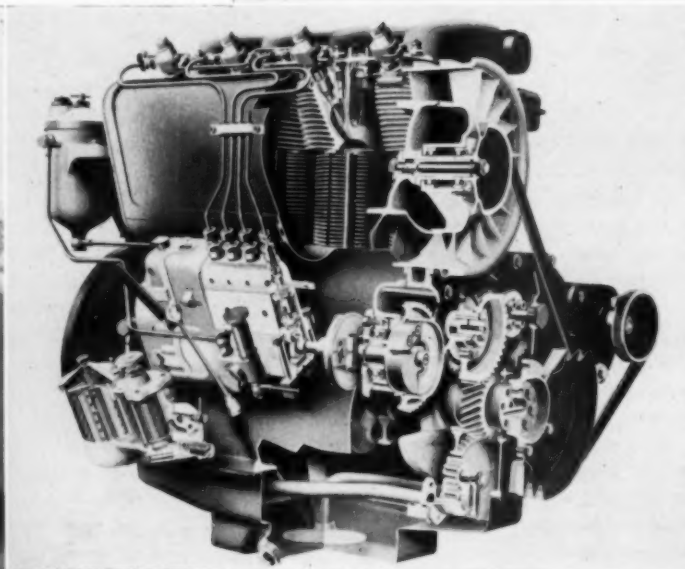
Construction of the Deutz air-cooled engine con-

Cutaway drawing of an F2L 712, 2-cylinder Deutz air-cooled engine. Blades of radial-flow air-cooling blower are visible on the flywheel.

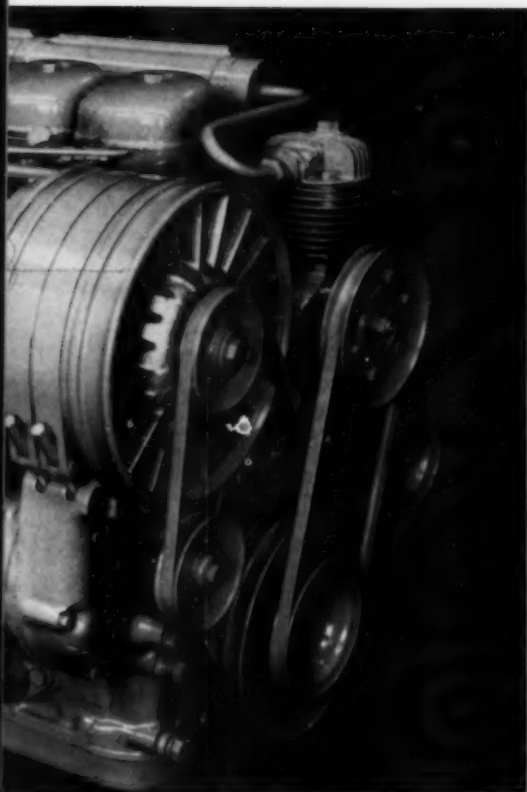
Cutaway drawing of a typical Deutz 4-cylinder air-cooled diesel showing arrangement of components. What first appears to be the cooling-air blower is actually a guide vane. The blower fan is directly behind this and is mounted on a shaft extending through the guide vane.



This all-hydraulically operated DEM-AG hoe is driven by a Deutz A3L 514.







alloy metal and contain a cast-in swirl chamber, which prolongs the thrust of the expanding gases and smoothes out the power impulses. Cylinder head fins multiply the surface which is exposed to the cooling air approximately 11 times. The cylinder head assemblies each contain exhaust and intake valves, valve springs and operating mechanism, renewable valve guides, intake and exhaust passages, an injector nozzle and a glow plug for cold weather starting. The injector is sloped so that part of the fuel injected goes directly into the cylinder and part is trapped in the swirl chamber. This system could be called a modified pre-combustion chamber system. It helps make the Deutz engines relatively insensitive to different types of fuel.

◀ The F6L 712, 6-cylinder Deutz air-cooled diesel of 311 cu. in. displacement; automotive rating, 95 bhp at 2800 rpm. Net weight, with sheet iron oil pan, 902.8 lbs. Full load fuel consumption at 1800 rpm is 0.418 lb./bhp. hr. Approximate dimensions: 25 1/8 in. wide, 33 1/2 in. high, 48 in. long.

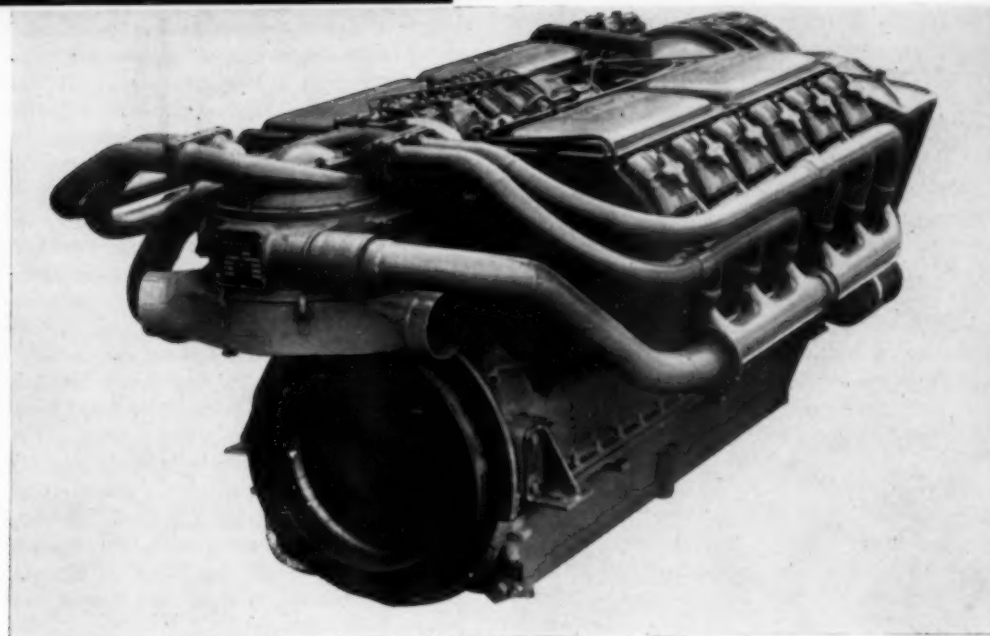
Deutz model BA12L-714 12-cylinder turbocharged industrial air-cooled diesel, with automotive rating of 350 max. bhp at 2300 rpm. This engine, like other 714 engines, has a thermostatically controlled gear-driven air cooling fan. ▶

case and is driven by a helical timing gear on the crankshaft. In both inline and V-type engines only one camshaft is used; in the V engines, it is mounted in the crankcase between the cylinder banks and above the crankshaft.

Crankcases on most Deutz air-cooled engines are ribbed for extra strength and extend well below the crankshaft centerline to provide additional rigidity. (Crankcases of the F1L and F2L series 712 engines are of the "box" type.) Oil pans or sumps on the other engines vary from grey cast iron to sheet steel or light alloy, depending on the type of engine and usage intended.

Crankshafts are of generously-proportioned, high-grade, heat-treated steel with inductively hardened journals. They run in steel-backed lead-bronze main bearings (one adjacent to each throw) and are fitted with balance weights. The single cylinder, F1L 712 engines are also provided with a contra-rotating weight on a separate "balance shaft" which counteracts any remaining horizontal inertia forces set up by revolving and reciprocating masses. In the V-type engines, which have an

◀ All lifeboats of the huge ocean liner Bremen have Deutz SA3L-712 air-cooled engines with inertia starters. ▶



sists basically of individual-finned cylinder heads bolted down on a one-piece crankcase casting which forms a support for the crankshaft main bearings. With this construction the individual cylinder heads and cylinders are available for inspection or repair without disturbing the other cylinders or without first lowering connecting rods and pistons through the base of the engine. Piston rings, wrist pins and pistons can be replaced in individual cylinders without removing the connecting rods from the crankshaft. A thorough job of inspection or overhaul would necessitate removal of the connecting rods and inspection and/or replacement of crankshaft bearings; emergency piston or cylinder repairs can be handled quickly.

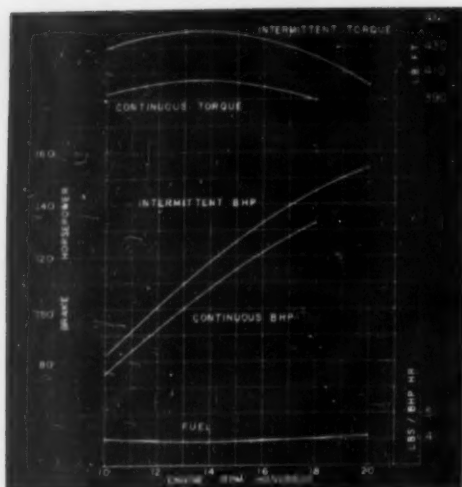
The cylinder heads are of heavily finned, light

Provision is made at the top of the cylinder heads for mounting the rocker arms, which are actuated by light alloy push rods extending up from the camshaft. The push rods are enclosed in tubes which extend through a projection of the cylinder head. A dust-proof and oil-proof rocker arm cover encloses the top of each cylinder head. Each cylinder head and its companion cylinder is securely bolted to the crankcase by four anti-fatigue-type hold-down studs. The cylinder castings include a skirt without fins which extends into the crankcase far enough to support the piston firmly at the bottom of each stroke. A synthetic rubber ring provides an oil seal between the crankcase and the periphery of the cylinder.

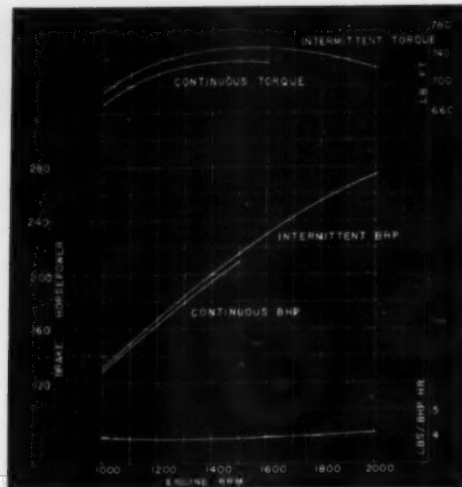
The camshaft is carried in bearings in the crank-

angle of 90° between the cylinder banks, each piston on one bank acts jointly on the same crankpin as the opposing piston in the opposite bank.

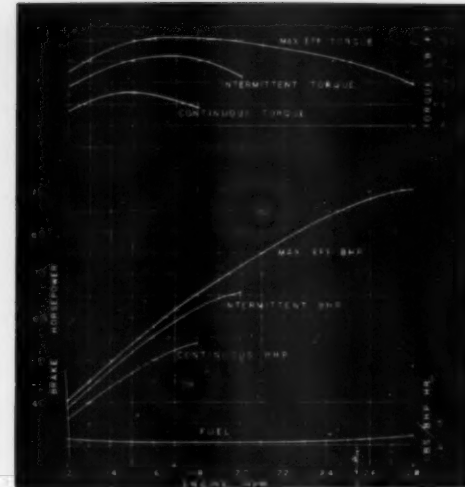
The pistons are of light metal alloy with three compression rings and two oil-control rings. The pistons of 514, 614 and 714 series engines have a divided depression in the top which splits the stream of atomized fuel and expanding gases into counter-rotating swirls calculated to provide more thorough combustion. They are mounted on drop-forged H-section connecting rods of heat-treated steel. All main and connecting-rod bearings are provided with renewable steel-backed lead-bronze bearing shells. One of the main bearings in each engine is designed as a thrust bearing to absorb any end-load on the crankshaft. Most Deutz diesel



Performance curves for Deutz A8L 714 engine.



Performance curves for turbocharged Deutz BA12L 714 engine.



Performance curves for Deutz F6L 712 engine.

fuel systems incorporate a centrally located Robert Bosch fuel pump and governor; all use Robert Bosch pintle-type fuel nozzles.

One and two-cylinder Deutz air-cooled diesels can be started by hand with a crank which is generally applied to a dog on the timing-gear end of the camshaft. Because the camshaft rotates at one-half the speed of the crankshaft, this gives sufficient leverage to turn the engine over easily, especially since a lever is also supplied to "decompress" the engine momentarily while cranking. The flywheels also carry the customary starting ring gear so that electrical, air motor or inertia starting can be used at the buyer's option. All other Deutz air-cooled engines are provided with Robert Bosch 12-volt or 24-volt electrical starters and battery charging generators, unless one of the other alternatives mentioned above is requested. Full pressure lubrication of all parts requiring it is provided by a lube oil pump, which is gear driven off of the front end of the crankshaft. Lubrication for the rocker arms is carried by a channel running up through the push rods.

### Cooling

Cooling is provided by a blower of generous output which forces air through a shroud and thence between and around the finned cylinders and cyl-

inder heads. A one-way flow of air is set up to pass into each bank of cylinders on one side and out the other. When operated as stationary engines or otherwise in enclosed spaces, provision must be made to carry the heated air away from the engine through ducts to prevent recirculation and consequent loss of cooling value.

Deutz uses two kinds of blowers for its engine cooling—radial flow and axial flow. The radial flow system, used only on the F1L 712 and F2L 712 (one and two-cylinder engines), consists of blading attached to the flywheel from whence the air is conducted by a spirally-shaped shroud to the cylinder and cylinder-head fins. The axial flow system is made up of a smaller, high-speed fan mounted behind a spoke-like grille or guide vane at the large end of a cone-shaped shroud. This distributes the air blast evenly between the cylinders. On the inline engines, the blower and shroud are mounted on the side of the engine opposite the intake and exhaust manifolds; in the V-type engines, the blower is mounted in the space between the cylinder banks. The blower is belt-driven on inline engines and gear-driven off the crankshaft of V-type engines.

An interesting recent improvement on the blower used in Deutz engines is the addition of thermostatic control. Already standard equipment on the 714 series V-type engines, this control is provided by a hydraulic drive (using lube oil as the driving liquid) connected to a thermostatic valve located in the cylinder bank. The blower in this case does not go into action until needed, which means a fast warm-up, and it is cut out when lack of a load or "coasting" in a vehicle tends suddenly to cool the engine below the most desirable temperature. Part-time operation of the air-cooling blower can decrease the parasitic load and increase fuel economy.

Since 1942, when the first air-cooled diesel was perfected by Klockner-Humboldt-Deutz, more than 300,000 Deutz air-cooled diesels have been placed in service. Deutz engineers report that among the operating advantages of air cooled diesels are the following details: Fast warm-up characteristics of the air-cooled diesels results in low cylinder wear when running on fuels containing sulphur. The en-

gines are easy to heat up for starting in sub-zero temperatures and air-cooling is very practical in warm or even tropical climates. The Deutz air-cooled design makes the engine wearing parts easily accessible and makes individual cylinders and cylinder heads readily accessible for inspection, repairs or replacement.

At first it is difficult to conceive of an air-cooled engine functioning well in hot climates, but Deutz air-cooled engines have many successful applications in Egypt, Afghanistan, Algiers, Arabia, Iran and other countries where desert temperatures prevail. The Royal Afghan Ministry of Public Works, for example, wrote Deutz: "Under the most difficult operative conditions and in temperatures ranging between plus 50 degrees C (+ 122° Fahrenheit) and -25° C (-13° Fahrenheit) the engines always run satisfactorily and reliably. Engines and machines suffered no output loss on long stretches through blazing regions in summer and on mountain passes with 8% to 12% gradients in heights up to 3,000 to 3,600 meters (9,840 to 11,800 feet)." Another advantage of air-cooling pointed out by Deutz diesel representatives is the ready availability of either end of the engine for power takeoff. Equipment can be powered from either end of the engine and even from the camshaft. This is important where accessory equipment with considerable power requirements must be run such as large pumps, PTO drives, etc.

### Chrysler's Distribution Plans

Diesel Energy Corp. of New York City, which for several years has been an importer of Deutz engines, will continue as importers. Chrysler, however, will be completely responsible for the sale and service of the high-speed engines. Chrysler plans to incorporate distribution of Deutz engines into the framework of its existing engine distribution network. Chrysler's 36 "engine centers" will be increased to 45; at least 25 of them will be complete service parts depots. Chrysler currently has 400 service outlets. Between six and 10 major parts warehouses will be strategically located. Mr. Nelson says that Chrysler will offer immediate service for the Deutz engines . . . "with a maximum of eight hours waiting time, no matter how remote or inaccessible the location."

DEUTZ Air-Cooled Engines imported by Chrysler Corp.

Series	No. Cyl.	Cu in. Displ.	Horsepower at given rpm	
			Continuous	Intermittent (automotive)
712	1	42	9 @ 1800	13 @ 2500
712	2	104	18 @ 1800	26 @ 2500
712	3	156	27 @ 1800	45 @ 2800
712	4	208	36 @ 1800	60 @ 2800
712	6	311	54 @ 1800	90 @ 2800
514	2	162	25 @ 1500	32 @ 1800
514	3	243	37.5 @ 1500	48 @ 1800
514	4	324	50 @ 1500	77 @ 2500
514	6	487	75 @ 1500	115 @ 2500
614	V6	487	75 @ 1500	115 @ 2500
614	V8	647	100 @ 1500	135 @ 2500
614	V12	974	150 @ 1500	230 @ 2500
614	V12*	974	190 @ 1500	280 @ 2500
714	V6	578	100 @ 1800	145 @ 2500
714	V8	771	134 @ 1800	195 @ 2500
714	V12	1157	170 @ 1800	260 @ 2500
714	V12*	1157	210 @ 1500	350 @ 2500

\* Turbocharged



# UNIQUE TEST FACILITIES SPEED TURBOCHARGER DEVELOPMENT

**T**HE Tapco Group of Thompson Ramo Wooldridge Inc. announced in 1957 a line of high-speed, low-inertia turbochargers for the diesel engine industry. The rapid development of this line into three basic turbocharger models has resulted from extensive, and unusually modern, design and test facilities at Willoughby, Ohio. Laboratory facilities at Willoughby include three endurance test stands with automatic recording instrumentation which may be operated simultaneously, two performance test stands with remote control consoles, 500 hp and 350 hp eddy current dynamometer test stands, a 600 hp dc dynamometer stand and an over-speed spin pit capable of testing rotating machinery at speeds up to 150,000 rpm in controlled atmospheres.

Engine test stands are located in separate, enclosed cells. A test control room is immediately adjacent and slightly elevated. There engineers can look down through windows at the test stands and conduct tests from remote control consoles, completely removed from the engine cells. For example, dynamometer tests are started, controlled and conducted from the test control room. Sitting at a console, the test engineer starts, accelerates and loads the engine. Readings are taken instantaneously from console instrumentation. Without leaving the console the engineer can make visual checks of exhaust smoke color. An intercom system lets him switch cell sound on and off as he wishes. Operating conditions during a test can be established to correspond with actual application of the engine.

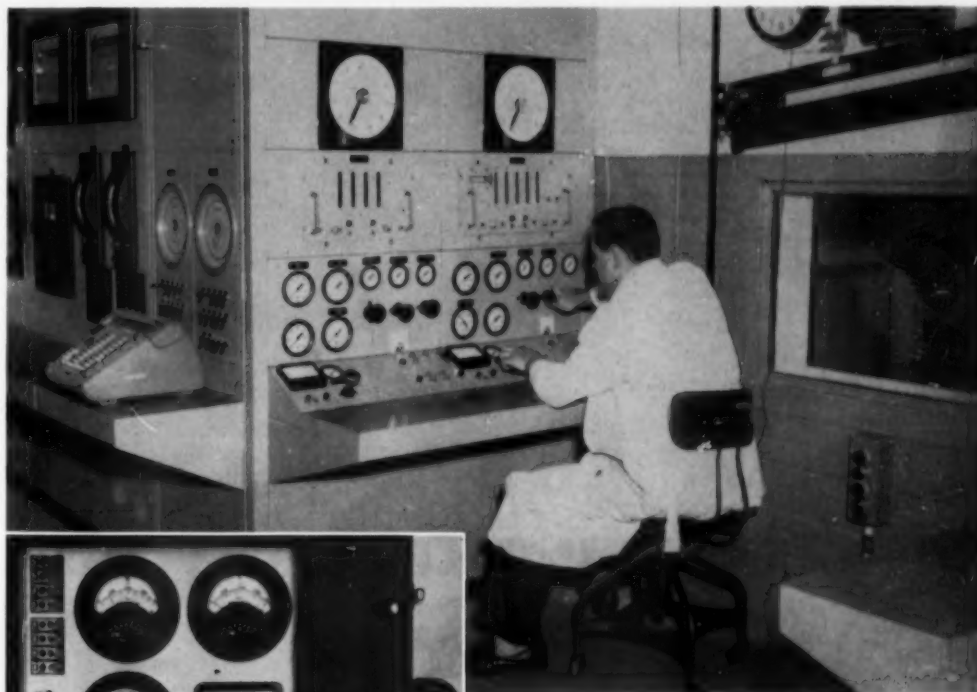
Special automatic recording instrumentation is provided for endurance tests. Turbochargers can be run 24 hours a day, seven days a week, completely

Engine dynamometer facilities supplement Thompson's turbocharger test program. After turbocharged-engine setup has been made, dynamometer tests are started, controlled and conducted from the test control room.

unattended. All pressures and temperatures are recorded for later study and evaluation. When desired, tests "to destruction" can be run safely and automatically. To speed development work, engineers can process data simultaneously with engine testing. For convenience, each console is equipped with an electric calculator. Extensive analog and digital computer facilities at another nearby Thompson plant augment the data processing equipment at Willoughby. In the test control room, sectional panel construction has been used to house gauges and other instrumentation

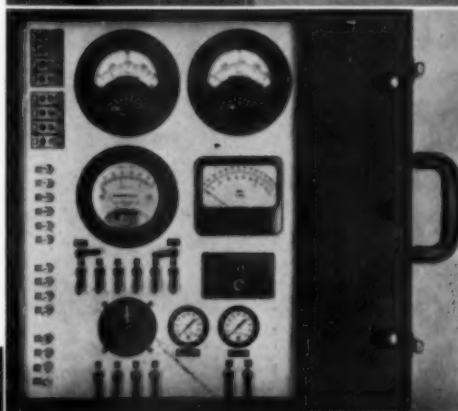
for the remote control consoles. By merely switching sectional components, test set-ups can be quickly and easily changed.

Turbocharger component designs are developed and evaluated in a special prototype production section of the Willoughby lab. To speed research and development work, prototype turbine wheels and impellers are first designed with the aid of IBM electronic equipment. Nozzles have been produced on numerically controlled milling machines. This reduces the cost of model hardware. Proto-



➤ This is the quiet engine control room which overlooks the test cells. Fully equipped consoles and advanced instrumentation assure accurate documentation of test results.

◀ This portable instrumentation kit was designed by Thompson for field testing. Engineer sits alongside operator of prime mover and records engine data under actual operating conditions. Note Alnor pyrometers.



type turbine wheels are checked on a Turbotronics contourscope. The operator is able to check any point on the wheel against any other point and within .001 inch. The Willoughby facility is operated by Thompson's ground equipment development department, which was organized to provide a design and development service in the turbomachinery and small gas turbine field.

This excellent testing facility is another good example of the intensive work being done by turbocharger manufacturers and engine builders to adapt most effectively turbocharging to today's and tomorrow's diesel engines.





◀ This KW-Dart 25SL, with Cummins diesel, Twin Disc torque converter and Fuller transmission is one of 30 being shipped to the Central Electrica de Furnas project in Brazil, purchased by the George Wimpy Co., of London, England, prime contractor.

P&H electric shovel loads into a 16 cu. yd. capacity KW-Dart powered by 320 hp Cummins NHRS turbocharged diesel. Luber finer lube oil filter is shown.



## DIESEL DUMP TRUCKS WORK AROUND THE WORLD

By L. H. HOUCK

**F**ANNING out from the new million-dollar Kansas City headquarters of KW-Dart, a subsidiary of Pacific Car and Foundry Co., 25 and 40-ton KW-Dart dump trucks are setting new material-moving records in a dozen foreign countries. Checking off the location of KW-Dart equipment on a world map is like reading a roster of the world's largest construction and mining jobs. Such acceptance is an endorsement of dieselized big capacity trucks that spells economy whether the exchange is rated in dollars, Swedish kronors, English pounds, or Venezuelan bolivars.

In the high Andes of Peru, 11,000 ft. above sea level, for example, Southern Peru Copper Corp., has 75 KW-Dart 25-ton trucks hauling rock overburden at the company's Toquepala copper mining operation. When the overburden has been removed, it is estimated that ore reserves of copper uncovered will total more than 400 million tons. Full ore production is scheduled for 1960 climaxing three years of stripping in tough rock formations. KW-Dart units used by Southern Peru are

25-ton, with Cummins NHRS 321 hp and NRTO 335 hp diesels with Twin Disc torque converters.

This sturdy truck, the model 25SL, end dump, warrants detailed description. Struck measure of the welded steel body is 16 cu. yds., heaped loaded it carries 19.2 cu. yds. sloped 3-to-1, a payload of 50,000 lbs. Frame is box girder type made of four plates welded into box section by submerged arc welding and gusset-supported cross members are welded integral with frame. Bumpers are extra strong tubular type, welded to frame instead of bolted, and frame is designed to permit maximum accessibility to engine.

Diesel engine is the Cummins NHRS, 6 cyl., supercharged, which has a bore of 5 1/8 in. and a stroke of 6 in., displacing 743 cu. in., 320 hp, torque 865 ft.-lbs. at 1600 rpm. Oil filter is Luber finer, and starter is 24-volt Delco-Remy. Air starting optional. Radiator and cooling system is KW-Dart manufacture and design. The heavy duty radiator is flat tube and fin type mounted on rub-

ber with a heavy duty radiator grille guard and Kysor automatic air controlled radiator shutters. Clutch is a Lipe-Rollway, 17 in. toggle-type, single plate, with 290 sq. in. heavy duty woven fabric facing material. Transmission Fuller 4-speed (4MS-1440) with power takeoff for hoist pump. Front axle is a Timken tubular with 25,000 lbs. capacity, drive axle is KW-Dart, 100,000 lb. capacity with an overall reduction of 4.12-to-1, with a final reduction of three 5.00-to-1 planets in each wheel, making a total gear reduction of 20.59-to-1.

Duals are spaced 4 ins. apart to promote better cooling. Trucks have air brakes and also retarder is available on torque converter. Front tires are 14.00 x 25, with a 20-ply rating for rock service, rear tires, four used, are 18.00 x 25 with a 24 ply rating for rock service. Fuel tank holds 100 gals. and is mounted on left side of frame, electrical system consists of two 12-volt batteries in series to supply the 24-volt starting and lighting system. Steering is Ross TE-71, roller mounted, twin lever type, Vickers hydraulic booster actuated by pitman

arm providing hydraulic power steering for finger touch control.

Such are some of the characteristics of the 25-ton dumper. A little farther south of the Southern Peru Copper operation, the Cerro de Pasco Corp., is using a fleet of these KW-Dart dumpers, equipped with Cummins 320 hp and 335 hp engines, both with Twin Disc torque converters. Operation is copper mining near Oroya. Still following the map south and still in the high Andes

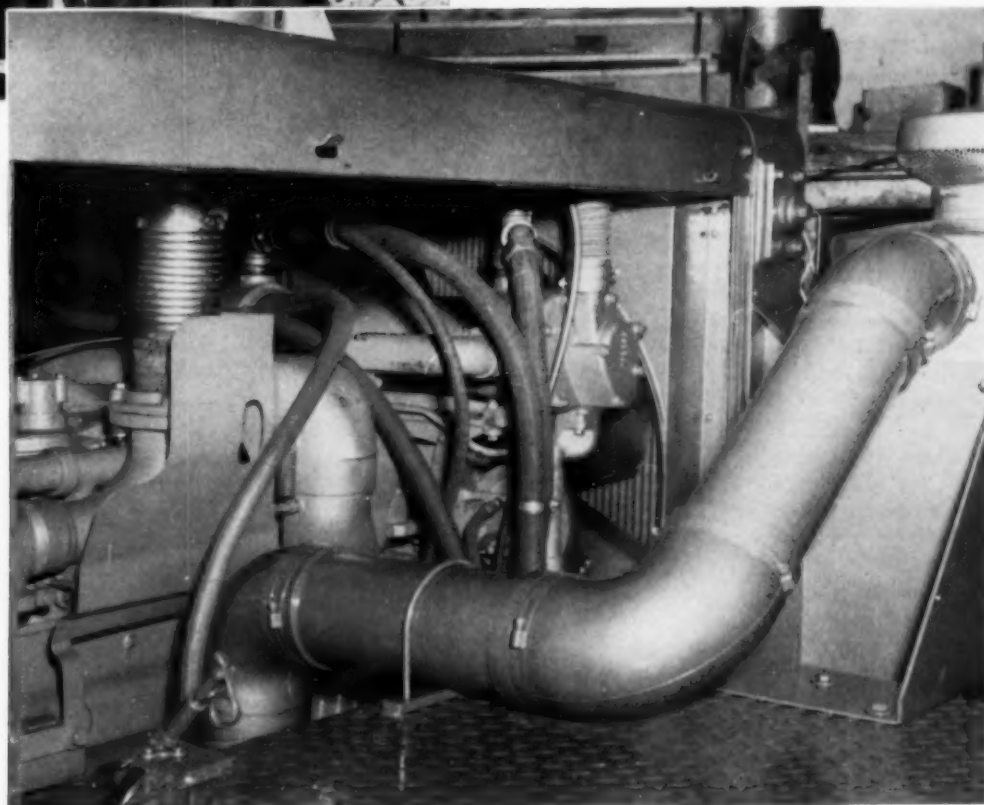
but in Chile, we arrive at what is probably the world's largest open pit copper mine. Chile Exploration Co., (Anaconda) use a fleet of KW-Dart 25 and 30-ton trucks at their El Salvador property. Both 25SL dumps and regular models are used for all hauling needs, since KW-Darts are used for mine service work such as hauling powder. Working at 10,000 to 12,000 ft. altitude, the Cummins naturally aspirated engines have maintained a high degree of efficiency in spite of the high elevation of this Chilean mine site.

So we leave the 4,000-mile long Andes mountains, bid adieu to Tierra del Fuego and the high glacier-fed lakes on the Patagonian border between Argentina and Chile and hop eastward into the largest South American country of Brazil. Here in Southern Brazil, the George Wimpy Co., of London, England, is the prime contractor on the construction of the third largest hydro-electric project in Latin America. A 400 ft. high rock-fill dam will create a reservoir 150 miles long. Wimpy is using ten 25SL KW-Dart dumps, two 25-ton trac-



Bauxite ore going down 11-mile roads to the Reynolds Mining Co., docks in Haiti, West Indies.

The Cummins diesel in the 25 SL is equipped with Vortox air cleaner and Stratoflex hose. Engine is also served by Purolator fuel oil filters and Nugent lube oil filter.



tors and thirty 25SL's and three more tractors are in the process of delivery. These trucks use Cummins NHRS-6 diesels rated 320 hp, and Fuller 10F1220 transmissions. This is the Central Electrica de Furnas dam project on the Rio Grande River. From South America we wing far north over the Atlantic to Sweden where your drinks are bought with kronors. Here what is probably the oldest corporation in the world, the 600-year-old Stora Kopparbergs Bergslags Aktiebolag, is using eleven 25-ton end-dump KW-Darts in the construction of the largest hydro-electric dam in Sweden. These diesels are hauling rock and fines down mountain sides with grades up to 14 per cent, on haul roads half mile to a full mile in length. These KW-Darts use the Cummins NHRS-6, 320 hp with Twin Disc torque converter. If "summer's almost gone and you feel like travelin' on" then visit Haiti, where 14 KW-Darts are moving bauxite ore down 11-miles of steep grades to the Reynolds Mining Co., docks; or "South of the border, down Mexico way" where 30 KW-Darts are working in Mexican mines, and on South to Venezuela, we find 8 KW-Darts carrying drilling equipment in the oil fields of this Northern South American country . . . not far from where we started with diesel dump trucks around the world.



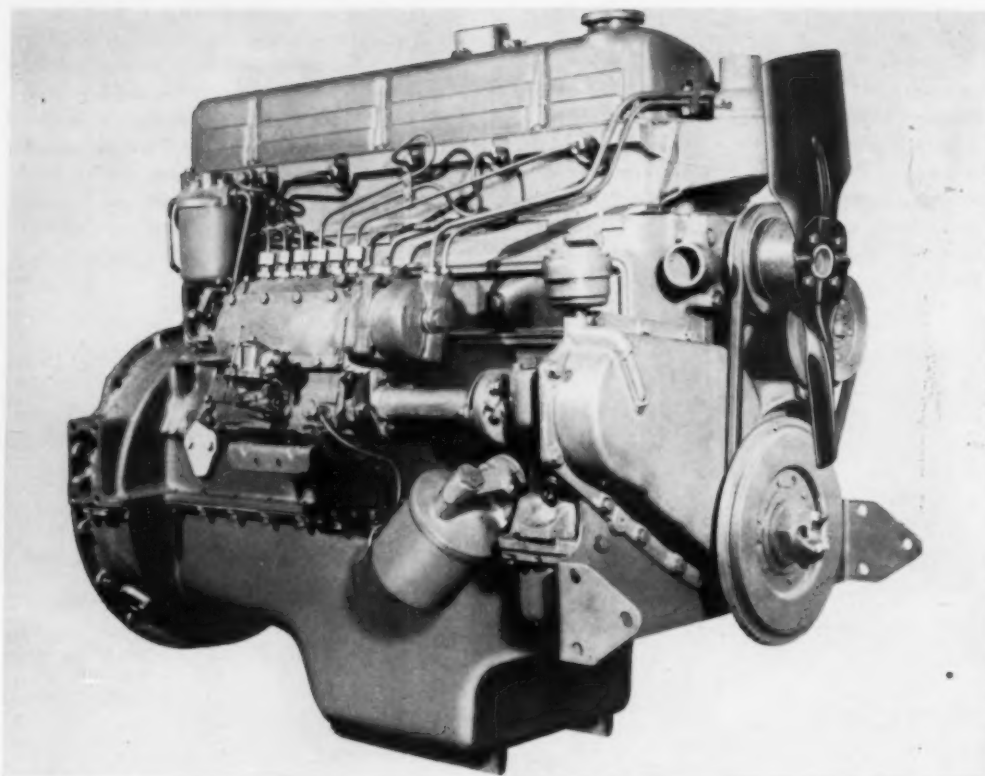
# FORD DIESELS HAVE WIDE APPLICATION

By J. W. BROWN

**I**NDUSTRIAL Engine Division of the Ford Motor Company at Dearborn, Mich., is marketing a line of industrial 4-cycle diesel engines built by the Ford Motor Co. Ltd., at Dagenham, England. There are presently two models available; the 4-cylinder 220 and the 6-cylinder 330 engines with dynamometer ratings of 60 and 96 bhp respectively at 2250 rpm. It is predicted that others will be added before much time elapses, to increase the available range of Ford diesel horsepower both upward and downward. For vehicular use, the 330 Ford diesel is rated at 108 bhp at 2500 rpm, with a pneumatic governor. For continuous, heavy-duty use industrially, the engines are rated at 80 per cent of their dynamometer horsepower.

The Ford 220 was introduced in this country as an industrial engine, about three years ago. It was no stranger to many users and mechanics, however, as it is virtually the same engine (but with higher operating speeds) as the one which had won respect as the power plant in big Fordson Major tractors. The 330 engine, offering more horsepower, has proven to be the more popular of the two, to the degree that it has outsold the 220 in total numbers, even though it has been available here for only about 18 months. Ford diesels are merchandised to individuals and small outside equipment manufacturers throughout the U.S.A. by the Ford Industrial Products dealer organization. Larger outside equipment manufacturers, who require factory engineering skill to meet installation problems, are handled from Dearborn.

While both 4-cylinder and 6-cylinder engine parts are carried by the Industrial Products dealers, full selections of wearing parts such as pistons, rings, valves, bearings, cylinder liners, injector nozzles, etc., are also carried by the Fordson Major Tractor outlets, because the 220 tractor engine and the 220 and 330 diesel industrial engines have the same bore and stroke (3.94 x 4.52 ins.) and a high degree of parts interchangeability as a result. Fordson Major Tractor mechanics will also have a high degree of maintenance knowhow applicable to the Ford industrial diesel engines. The Ford diesel engines have a number of desirable refinements including tinplated aluminum pistons; replaceable wet type cylinder sleeves and 12-volt starting systems. The crankshaft bearing supports are cast integrally with the block; crankshaft is a heavy-duty, induction hardened, statically and dynamically balanced forging supported by five main bear-

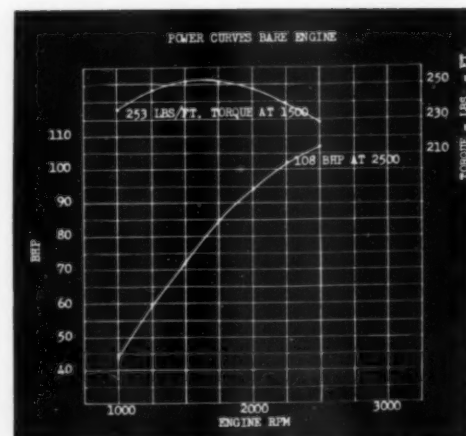


This is the Ford 6-cylinder, model 330 industrial fan-to-flywheel diesel engine.

ings in the four-cylinder engine and by seven in the "six."

One of the features that is distinctly worth mentioning is that all exhaust valve mechanisms include a rotating device which assists in reducing warpage and in preventing the valves from developing an improper seat with consequent leakage. High tungsten chrome-alloy steel valve seat inserts are used. Each of the die-cast, aluminum alloy pistons carries five piston rings: three compression rings and two oil-control rings. The top compression ring is parallel-faced, hardened and tempered. The cylinders are of the open combustion chamber type with direct fuel injection from Simms four-orifice injectors. Main and connecting rod bearings in the Ford industrial diesels are steel-backed, copper-lead alloy replaceable bearings. The iron alloy camshaft and centrally located Simms fuel injection pump are gear driven off the front end of the crankshaft by means of a pinion mounted on the crankshaft. The gears run in a continuous bath of lubricating oil in a housing just back of the fan pulley and the vibration dampener.

The Simms fuel pump assembly is removable as a unit for repair or exchange. The assembly includes the operating mechanisms which activate and control individual high-pressure fuel injection pumps—one for each cylinder. It also includes the governor and a lift-pump which supplies fuel to the fuel injection pumps. The governor may be either a vacuum type pneumatic governor or a fly-ball mechanical governor, depending on the service intended for the engine or the requirements of the installation. When the mechanical governor is used it is mounted on the drive shaft of the injection pump and connected by linkage to the fuel control rod. Mechanical governors on



Power curve of Ford 330 industrial diesel engine with pneumatic governor (mechanical governor holds top speed to 2250 rpm).



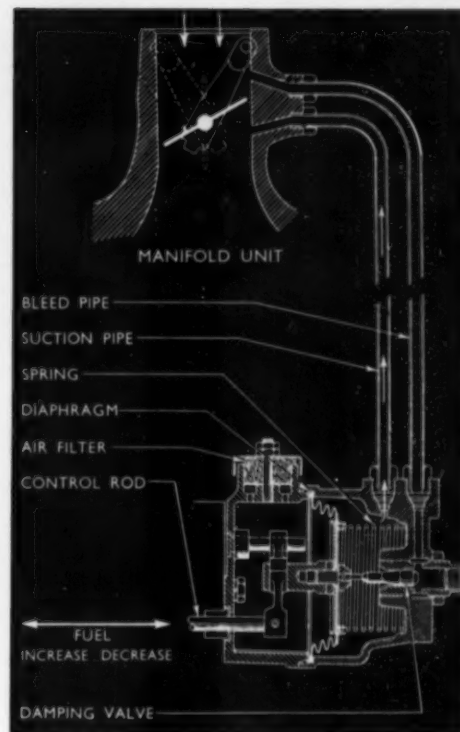
the Ford industrial diesels limit the top speed to 2250 rpm, but they provide speed control within closer limits than the pneumatic governors. On vehicular applications and on industrial applications where higher speeds (up to 2500 rpm) are desired and where exact speed is a lesser requirement, Ford 220 and 330 diesels are fitted with a pneumatic governor.

Because pneumatic governors are seldom found on diesels in this country a few words on their operation and advantages may be in order. The pneumatic governor on the Ford industrial diesel is simple in construction and has fewer wearing parts than mechanical, "fly-ball" governors. It has no rotating parts at all. Through its use the fuel fed to the injector nozzles by the fuel pump is regulated by the vacuum which occurs in the intake manifold below a throttle plate. The throttle plate is very similar to those found in carbureted

engines; it may be connected by linkage to a hand throttle or to an accelerator. The Ford pneumatic governor is considered as being made up of two units: the throttle plate unit in the intake manifold and the diaphragm unit which bolts on to, and becomes part of, the fuel pump assembly. Two small pipes, one leading off above and one below the throttle plate, are connected to the diaphragm unit. As the line illustration in this article shows, one of the pipes (the one connected below the throttle plate) sets up a vacuum in the sealed chamber just back of the governor diaphragm when the engine is running.

When the engine is stopped, the governor spring pushes the diaphragm and the control rod to the left, the maximum fuel delivery position. As soon as the engine starts, the high air speed past the almost closed throttle valve and suction pipe orifice creates a high vacuum in the diaphragm chamber, which causes the diaphragm and fuel pump control rod to be drawn towards the right, reducing the fuel delivery. When the engine is operating under load, with the throttle valve fully open, the vacuum in the diaphragm chamber is low, due to the low air speed past the throttle valve, and the diaphragm and control rod are held in the maximum fuel delivery position by the governor spring. Any variation in the setting of the throttle valve or engine load causes a variation in the air speed past the throttle valve, and consequently a change in vacuum in the diaphragm chamber, and so varies the fuel delivery.

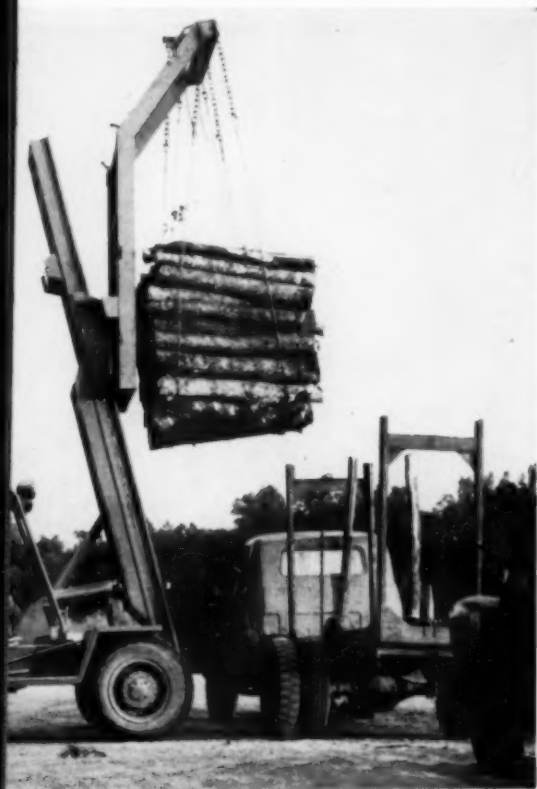
As an aid to cold starting, the Ford industrial diesels have an "excess fuel supply" feature. The excess fuel lever is mounted at the end of the fuel control rod on the fuel pump assembly. When pulled outwards, this lever permits greater travel of the fuel control rod, in effect providing the engine with more fuel than is normal, through the injection pump and injector nozzles while cranking. As soon as the engine starts the governor takes over and the excess fuel lever drops back into a position where it again limits the fuel control rod travel and consequently the maximum fuel



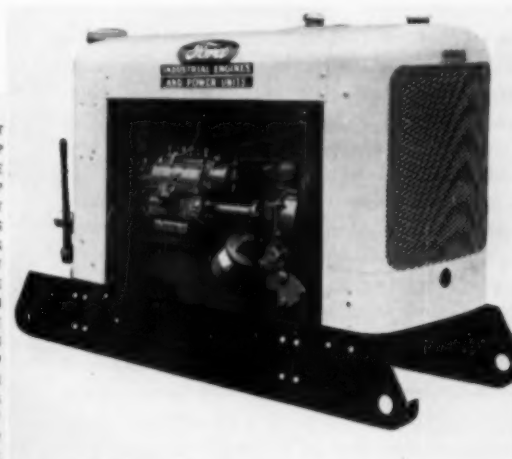
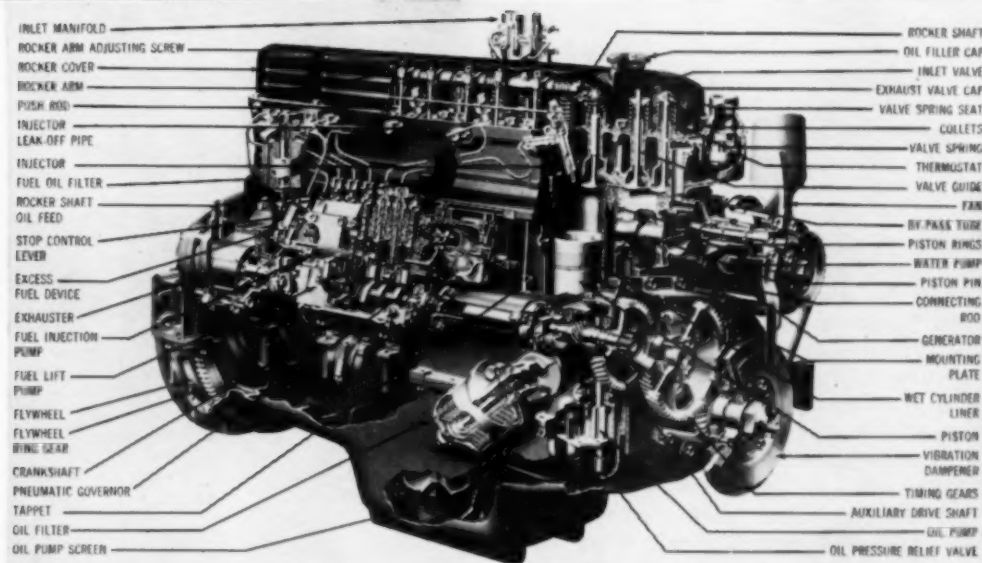
Diagrammatic view of throttle control and pneumatic governor used on Ford industrial diesels.

which can be injected. In another position, the excess fuel rod pushes the control rod into a "no fuel" or "stop" position.

Ford 220 and 330 industrial diesel engines are furnished either as fan-to-flywheel engines or as base-mounted power units. They can be obtained with a variety of accessory equipment including S.A.E. No. 3 or No. 4 flywheel housings; heavy-duty 3-speed, 4-speed and 5-speed truck type transmissions; and Rockford heavy-duty power takeoffs with either over-center or spring type clutches. The English-built Ford diesels have already been installed in a wide variety of industrial applications in this country.



This Taylor Machine Works pulpwood yardster, working in an Alabama yard, is powered by a Ford 330, 6-cylinder industrial diesel.



Basemounted Ford model 330 industrial diesel engine.

Cutaway view of the Ford model 330 diesel.



264 ft. *Morania Abaco* is the only tanker specifically designed and built for the asphalt trade. Vessel is propelled by a 2000 hp Fairbanks-Morse opposed-piston diesel and has cruising speed of 12 knots fully loaded.

2,000 hp model 38D8½ Fairbanks-Morse diesel looking aft toward the Falk reverse-reduction gears. Engine is equipped with Woodward governor and is served by Alnor pyrometer, Ross heat exchangers and Quincy air compressors.

## ASPHALT TANKER *MORANIA ABACO*

**Morania Oil Tanker Corporation's New Tanker. Powered By 2,000 HP Fairbanks-Morse Diesel, Shows How New Approach to Transportation Can Revolutionize an Industry**

By DOUGLAS SHEARING

**T**HE *Morania Abaco* is demonstrating that a fresh approach to transportation problems can not only cut costs but sometimes actually revolutionize an industry. Propelled by a 2,000 hp Fairbanks-Morse opposed-piston diesel, the new tanker is one of the busiest vessels in the East and is making a notable record for efficient and economical service. Morania Oil Tanker Corp. is an exponent of basic research in transportation techniques. Organized in 1947 to handle marine movement of petroleum products, the company today is the only large marine transporter of asphalt on the East Coast. Morania's scope of operations is constantly expanding with growing service to the petrochemicals industry. "If a company or an industry has a problem in the movement of materials," says Morania President William J. McCormack, "we often can provide or design vessels or barges that effect important economies." The *Morania Abaco* did more than that for the asphalt industry. Traditionally, asphalt has been shipped in drums in solid form, then chopped up and heated in the field before use. This not only involves costly packaging and shipping but, more

important, means slow and inconvenient handling with high labor costs for the end user. At temperatures above 260° F., however, asphalt flows freely and can be pumped as a liquid. It was apparent to industry and Morania officials that in some major asphalt markets a revolution in handling could be accomplished if the material could be kept hot and treated as a liquid from refinery to field application. Some has been shipped by rail tank car and barge but this has either sharply limited delivery range or required reheating of solidified material to permit unloading.

The *Morania Abaco* is the first tanker specifically designed and built for asphalt transportation. Designed by Merritt Demarest, prominent naval architect of Jersey City, and built at the Camden yards of the RTC Shipbuilding Corp., the new tanker is equipped to do the job envisioned. Asphalt at 350° F. is pumped into her tanks at the refinery in Baltimore, Md. Her own steam heating system keeps the material hot during voyages to East Coast, Gulf Coast and river ports where it is pumped into heated tanks at dealer terminals.





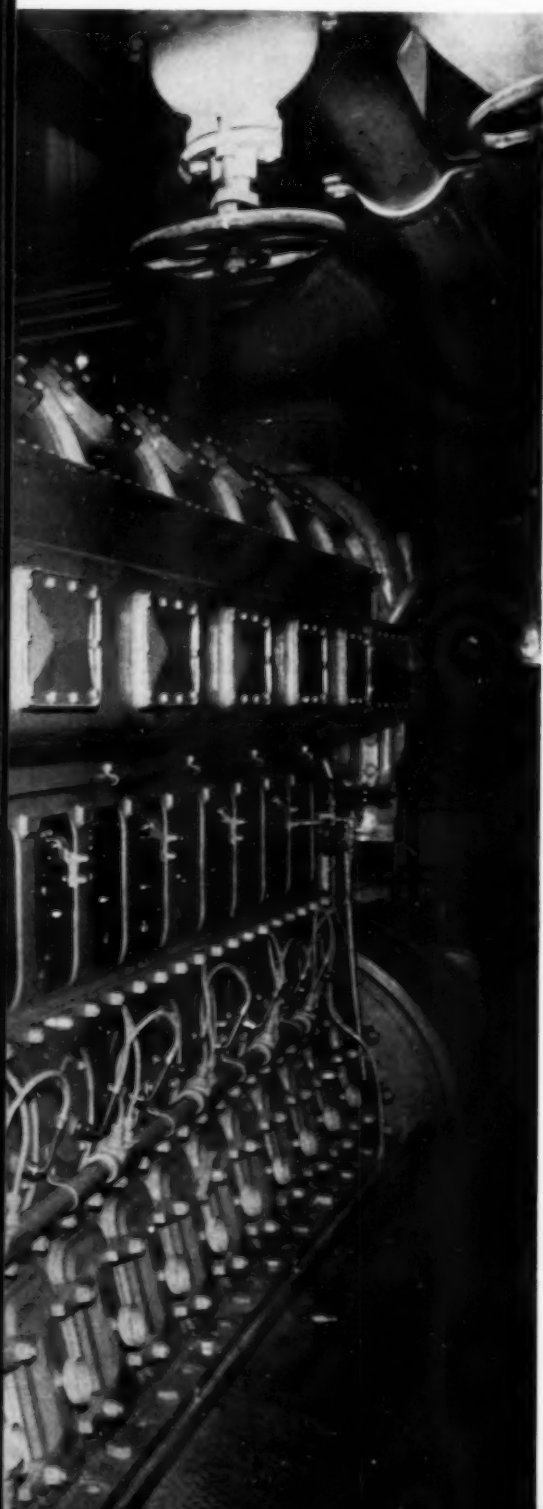
Thus, a tank truck spreader can come to the terminal, take on a load of hot, liquid asphalt, drive directly to the job site and spread the material on the road with a minimum expenditure of time and labor. Savings in loading, transportation, unloading, distribution and end use far outweigh the cost of keeping the asphalt hot. The *Morania Abaco* is an all-steel, welded, double-hulled vessel with: a length over all of 264 ft., a beam of 47 ft., a depth molded of 18 ft. and a draft loaded of 15 ft. 9 in. Her 12 main cargo tanks (six port and six starboard) have a combined capacity of 18,000 bbls. This means a rated capacity of 16,000 bbls. of asphalt with volume calculated at 60° F. Carried at a temperature of 350° F., this quantity of asphalt expands to 17,700 bbls. A unique feature of the vessel is the provision for use of the double bottom and wing tanks to carry either ballast or as much as 6,000 bbl. of heavy furnace oil. She could serve wholly as a petroleum carrier with 23,000 bbl. capacity but is in too great demand by

the asphalt trade. The new tanker can pump off a full cargo of hot asphalt in little more than three and a half hours using a pair of specially-designed, diesel-driven Waterous pumps with combined rating of 5,000 bbl./hr. A deep well turbine pump handles ballast or furnace oil. To keep the asphalt hot, the cargo tanks are equipped with double sets of steam heating coils. During loading or unloading, these coils can be connected to a shore steam supply. During the voyage, steam is provided by a vertical steam generator. There is enough heating capacity to keep the asphalt hot for deliveries anywhere on the East Coast or the Gulf of Mexico.

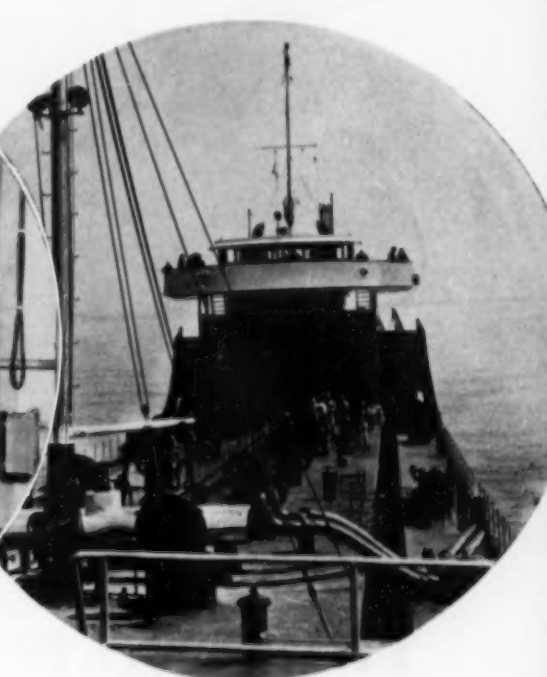
The propulsion engine for the *Morania Abaco* is a 12 cylinder model 38D8½ Fairbanks-Morse opposed-piston diesel rated at 2,000 hp at 800 rpm. This powerful, compact engine turns a 5-bladed Ferguson bronze propeller through Falk 2.76:1 reverse-reduction gears and Airflex clutch. With

motor. The fresh water circulated through the engine jackets is cooled in a one-pass heat exchanger. The tanker carries 34,000 gal. of fresh water. Starting air for the diesel is supplied by a pair of compressors driven by 3 hp motors. The Fairbanks-Morse engine panel holds an exhaust pyrometer, gauges and pressure and temperature alarms. The two auxiliary diesels are General Motors. The tanker normally carries a crew of 17 but has quarters for 20.

Since going into service last summer, the *Morania Abaco* has been a busy tanker and has had ample opportunity to prove the soundness of her design and equipment. She has been taking on asphalt at Baltimore and delivering it to Savannah, Ga., Wilmington, N.C., to Richmond, Va., up the Hudson River to Troy, N.Y., up the Connecticut River to Portland, Conn. and as far north as Woolwich, Maine. Other ports will be added, for this coast-wise tanker has an extensive operating range. The



Much of the tanker's communications equipment is housed in this RCA Radiomarine console. The vessel is equipped with RCA wireless telegraph, radar, direction finder, and ship-to-shore telephone.



Looking aft at the pilot house of the *Morania Abaco*. Her 12 main cargo tanks give her a rated capacity of 16,000 bbls. of asphalt. Double hull and wing tanks can be used to carry an additional 6,000 bbls. of heavy furnace oil.

this propulsion unit, the *Morania Abaco* is maintaining easily the designed cruising speed of 12 knots fully loaded. Engine power, dependability and efficiency are important economic factors in the operation of any commercial vessel but particularly in the case of a tanker such as this that carries literally hot cargo. Here, speed and efficiency increase the effective operating range. The 52,000 gal. fuel oil capacity is more than ample for any contemplated voyage, supplying both the efficient opposed-piston diesel and the steam generator. The F-M diesel is served by a full complement of accessory equipment. The Fairbanks-Morse jacket water and lube oil pumps are engine-driven. The oil is routed through a two-pass lube cooler and a 12-cartridge filter. There is also a 350 gpm auxiliary lube pump driven by a 25 hp

*Morania Abaco* was designed and equipped to solve the transportation problems of the asphalt industry. On the basis of her first months of operation, her owners feel she is doing her job, and doing it superlatively.

#### List of Principal Equipment

Main engine	Fairbanks-Morse
Governor	Woodward
Reverse reduction gear	Falk
Clutch	Airflex
Propeller	Ferguson
Heat exchangers	Ross
Air compressors	Quincy
Exhaust pyrometer	Alnor
Alarm system	Viking
Auxiliary diesels	General Motors (Detroit)





← The new Dodge diesel tandem tractor, model NCT-1000, with Cummins NH-220 diesel engine; gvw of 53,000 lbs. and gcw of 76,800 lbs.

→ The Cummins 6-cylinder, 743 cu. in. displacement NH-220 which will power the largest of three new Dodge 1960 model diesel trucks.

→ Talking over the new Dodge diesel trucks at the International Petroleum Exposition are (from left) C. B. Foster, London, England, general sales manager of Cummins Engine Co., Ltd.; C. R. Boll, Columbus, Ind., Cummins vice president—sales; M. R. Krause, manager—engineering, trucks for the Dodge Division of Chrysler Corp.; and R. W. Van Demark, truck sales engineer from the Dodge office, Detroit.



## THREE NEW DODGE TRUCKS WILL USE CUMMINS DIESELS

By J. W. BROWN

**T**HE Dodge Division of the Chrysler Corp. will have three new heavy-duty diesel trucks in its 1960 line, according to an announcement made at the recent International Petroleum Exposition in Tulsa, Okla. Lifting the curtain only enough to give newsmen a glance at the largest of the four, Dodge executives revealed the range of gross vehicle weights and gross combination weights of the four new units. They will be an important part of Dodge's overall 1960 truck line. Dodge announced that all three trucks would be powered by a range of four Cummins diesels.

The largest of the new trucks, which is pictured on this page, will be a diesel tandem tractor with a gvw of 53,000 lbs. and a gross combination weight (truck, trailer and load) rating of 76,800 lbs. This NCT 1000 model was the only one given an advance showing, probably to catch the eye of

petroleum industry personnel at the big International Petroleum Exposition.

The NCT 1000 tractor will be powered by a Cummins NH-220 6-cylinder engine, which has a rating of 220 bhp at 2100 rpm. With a bore and stroke of 5 1/4 in. x 6 in., this power plant weighs 2420 lbs., or 11 lbs. per bhp. It has all the well-known Cummins features, including 4-cycle operation; the Cummins PT (pressure-time) fuel system; large exhaust and air passages; overhead valves with Stellite valve seat inserts; open-type combustion chambers; keystone compression rings; cam-ground pistons; wet-type cylinder liners; roller cam followers; hardened-steel camshaft; high-strength connecting rods; and a heavy-duty, fully counterweighted crankshaft.

The three new trucks will encompass a range of

from 27,000 to 53,000 lbs. gvw and from 50,000 to 76,800 lbs. gcw. Full details of the new trucks have not been revealed, but a DIESEL PROGRESS representative noted that the NCT 1000 tractor unveiled at Tulsa had Fram dry-type air cleaners, Perfex radiators, Luberfiner oil filters, Nelson mufflers and a Fuller 4-R-96 transmission. The Cummins diesels which will power the other two new Dodge trucks are, in descending order of size, the NH-195, NH-180 and C-175. The NH-180 and NH-195 are both naturally aspirated 6-cylinder engines of 4 7/8 in. x 6 in. bore and stroke. They were recently introduced by Cummins "to give operators hauling 50,000 lbs. gcw to 76,800 lbs. gcw more miles per gallon and more miles between overhauls." For the all new Cummins C-175 Turbo-diesel engine, the new Dodge truck installation could be the first important application.

Mr. M. C. Patterson, Dodge general manager, said that the C-175 Turbo-diesel, which is rated at 175 bhp, weighs only 1575 lbs. "This C-175 model has

at least four outstanding features," he said, "greater fuel economy, more power without increased size and weight, a weight-to-horsepower ratio of only nine pounds and less power loss at high altitudes." He explained that the new trucks were especially designed for diesel operation. "We are particularly pleased to be able to offer Cummins diesel engines," he said. "We know the fine reputation for quality that Cummins has built up will help make our new models immediately popular with all segments of the heavy-duty trucking industry."

"The addition of diesel engines to our versatile line of gasoline trucks opens an entirely new area to us, particularly in states west of the Mississippi River. The NH-220 diesel makes us the first of the 'low-priced three' to offer a truck capable of operating efficiently in the upper heavy-duty field."

"Our new diesel trucks with the NH-220 engine will offer a maximum gross combination weight rating of 76,800 lbs., more than 15 per cent greater than we offer on present models. This gcw will enable our new trucks to carry virtually any product and commodity in over-the-highway operations in the highly-dieselized Western states."

# MULTIPLE- TURBOCHARGING UNION PACIFIC DIESELS



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- Engine exhaust free of smoke and sparks
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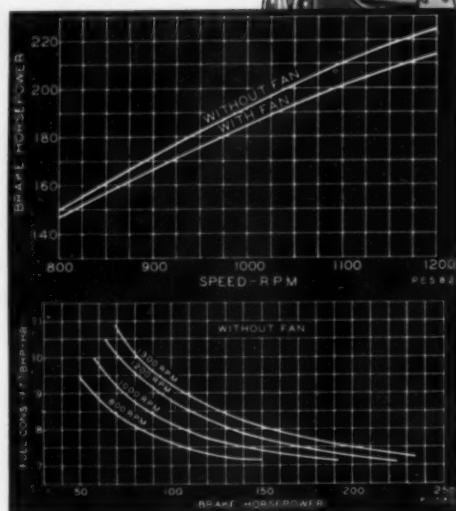
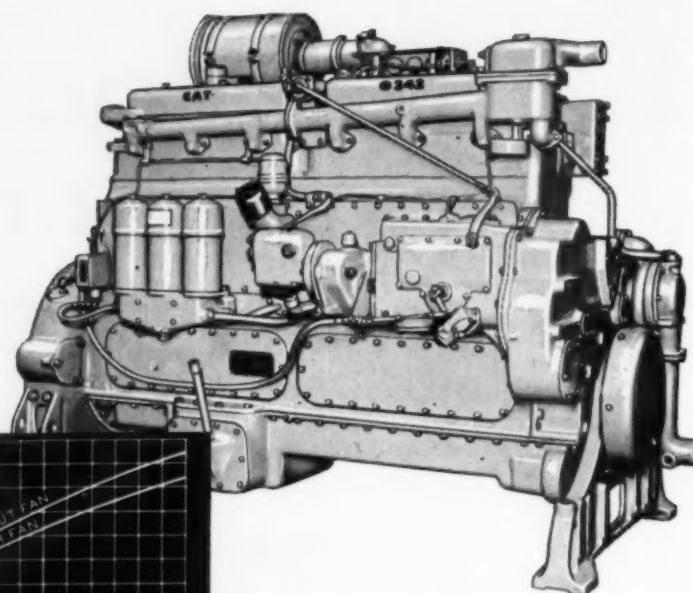


# CAT'S NEW G342 NATURAL GAS ENGINE

**N**EWEST in the series of natural gas engines being produced by Engine Division, Caterpillar Tractor Co., is the 7000 Btu/bhp hr. G342. Introduced in Houston at the ASME Oil & Gas Power Division's 1959 meeting and exhibit and shown later at the Tulsa Oil Show, the G342 Series C is a four-cycle, valve-in-head, spark ignition engine with six cylinders of  $5\frac{3}{4}$  in. bore, 8 in. stroke and a piston displacement of 1246 cu. in. It is available in two compression ratios so that a wide variety of gaseous fuels may be burned. Methane-type gases such as commercial natural gas and sewage gas with a high heat value not greater than 1150 Btu's/cu. ft. can be burned in the 10.5:1 compression ratio engine. Propane may be used in the 10.5:1 if it does not contain butane in quantities above the maximum allowable for commercial grade propane. It is suitable for non-lug applications. Butane or field gases can be used with the 7.5:1 engine. At 1200 rpm without fan, the 10.5:1 engine is rated 225 bhp and the 7.5:1 engine, 200 bhp. The G342 is the third in the Caterpillar gas engine line, supplementing the G347 Series D and G397 Series D, eight and 12 cylinder V-type engines, respectively.

In conjunction with the display of the new engine in Houston, Caterpillar's R. D. Henderson, assistant director of research, and J. C. Hallinan, research staff engineer, presented a paper, "Development of a High-Compression-Ratio Gas Engine." Designated 59-OGP-5, this paper describes Caterpillar's objective of using a basic diesel engine in producing a gas engine that would equal or exceed the output of the company's naturally aspirated diesel, and then traces the design, engineering, testing and production of this unit.

In its fuel system, the G342 utilizes a heavy-duty industrial type carburetor designed to maintain optimum fuel-air ratio at all loads and speeds. The carburetor incorporates a device called an "economizer" which supplies additional fuel at low manifold vacuum. This increases the power output of the engine and lowers the exhaust temperature at the same time because of the richer mixture.



➡ The new G342 Natural Gas Engine. Unit can be converted to diesel operation by changing pistons and fuel systems.

⬅ Horsepower and fuel consumption curves for the G342 with standard equipment, 10.5:1 compression ratio. Ratings are corrected to sea level (29.92 in. Hg.) and 60° F temperature.

The combustion chamber on the 7.5:1 compression ratio engine has a flat-top piston with a maximum power beep of 116. The 10.5:1 ratio engine has a dish-shaped piston with a 124 beep.

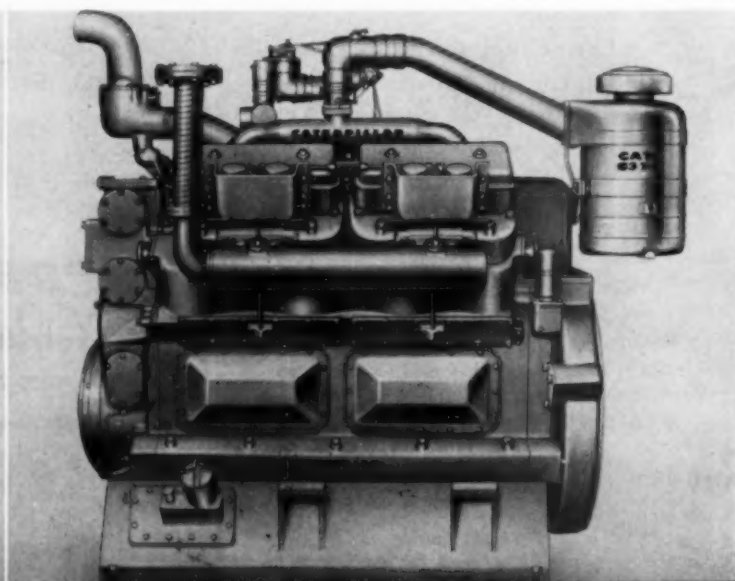
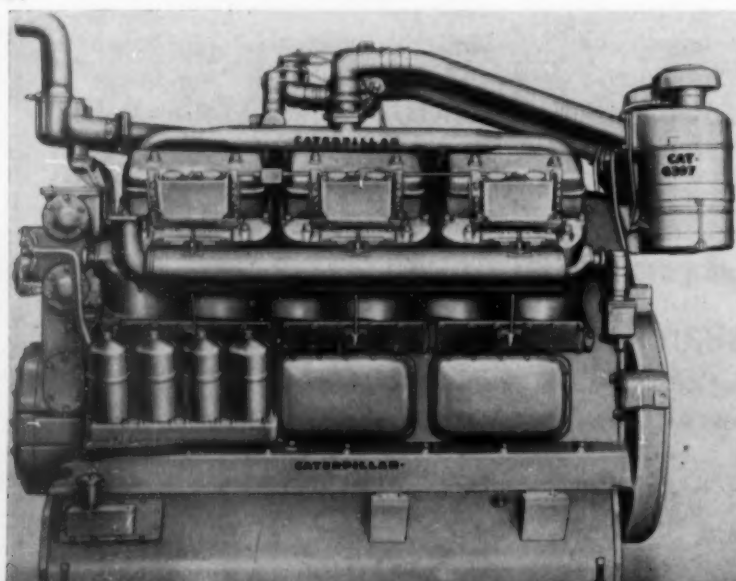
A low tension ignition system is used on the G342 as on the other two gas engine models. Individual high voltage spark coils are mounted close to each spark plug with short high tension leads. According to Caterpillar, the advantages of this system are (1) low voltage within the magneto means longer breaker point life; (2) the corona effect is

minimized; (3) the problems of shielding the high tension leads for radio and television are reduced; and (4) the capacitance of the system, one of the causes of short spark plug life, is reduced.

The G342 retains most of Caterpillar's general construction characteristics. The cooling system has a built-in, gear-driven centrifugal type circulating pump with thermostatic water temperature control. A full pressure system of lubrication is likewise employed with gear-type pump and full flow filter. The G342 has an approximate dry weight of 5240 lbs. with a length overall of 81.1 in.; width, 44.7 in. and height, 64.6 in.

G397 12-cylinder, V-type, 10.5:1 ratio Natural Gas Engine is rated 470 hp at 1300 rpm.

Eight-cylinder Cat G375 Natural Gas Engine with 10.5:1 compression ratio is rated 310 hp at 1300 rpm.





## Robert W. Kerr Named Fairbanks-Morse President



Robert W. Kerr

Mr. Robert W. Kerr, 55-year-old production executive with wide experience in the machine industry, has been elected president of Fairbanks, Morse & Co. He succeeds Mr. Robert H. Morse, Jr., who was named vice chairman of the board. Mr. Frank H. Cankar, 43, who recently joined Fairbanks-Morse, was elected to the newly created post of vice president—administration. Mr. William S. Schwab, Chicago attorney, who is a director of Fairbanks Whitney Corp., parent company of Fairbanks-Morse, and Mr. Delmar W. Holloman, Washington, D.C., attorney, were elected assistant secretaries of the company. Kerr is also vice president in charge of subsidiary operations for Fairbanks Whitney, an office he assumed on March 1 of this year. Prior to that he served for five years as vice president and group executive of the American Machine and Foundry Co. with primary responsibility for the direction of 14 A.M.F. subsidiaries or divisions. From 1948 through 1953, Kerr was with the Bingham-Herbrand Corp., Toledo, Ohio, where he was president and chief executive officer, as well as director. Earlier he had been executive vice president and director of the Plomb Tool Co., Los Angeles. He is a graduate of the University of California at Los Angeles. Cankar is a graduate of Northwestern University. A former account executive with Fletcher D. Richards, Inc., New York, Cankar joined the American Machine and Foundry Co. in 1952. His last executive position with A.M.F. was as vice president and general manager of the Cycle Division in Little Rock, Ark.

## Two New Vice Presidents Appointed by Kent-Moore

The election of Messrs. James S. Lanham and Louis C. Krieser as vice presidents of Kent-Moore Organization, Inc., was announced by Mr. J. D. Adair, president. Lanham, Kent-Moore's chief engineer since 1953, assumes the position of vice president—engineering at the executive offices in Warren, Mich. Krieser, located at the Jackson (Mich.) factories, becomes vice president—special



J. S. Lanham



L. C. Krieser

products. Lanham has been in the automotive industry since 1934 with various engineering capacities at Ford Motor Co. and the R. V. Harty Co. He joined Kent-Moore in January 1953. Krieser, who began his career with Fairbanks-Morse in 1921, also formerly held engineering and production positions at Pullman Standard Car Co., Buda Manufacturing Co., and Whirlpool Seger Corp.

## New Appointments at Worthington

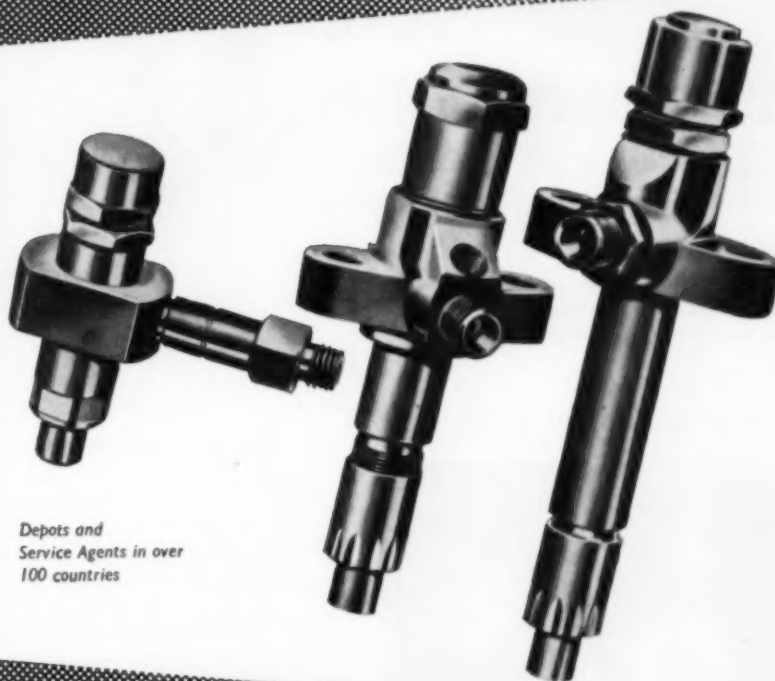


Walter E. Max

Mr. Walter E. Max is appointed assistant general manager of Worthington Corporation's Compressor and Engine Division announced George Steven, general manager of the division. Mr. Max joined Worthington in Buffalo in 1934 as an apprentice in the Machine Shop. In 1936 he left Worthington to further his education at Iowa State College where he spent three years in Mechanical Engineering. He rejoined Worthington

in 1939 as a special apprentice in engine test. Later he joined the standards department, and during World War II was in charge of sub-contracting. In 1944 he was appointed manager of the Buffalo Multi-V-Drive Division, and since 1950 has served as manager of service & erection department, general superintendent and manager of manufacturing. Mr. Howard E. Ewell is appointed Manager of Manufacturing, succeeding Max. Mr. Ewell is a 1939 graduate of Clarkson College in Mechanical and Electrical Engineering. He joined Worthington upon graduation. During the period of his employment with Worthington, he has served successively in commercial test, research department, as assistant chief inspector, maintenance engineer, and general superintendent.

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## WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

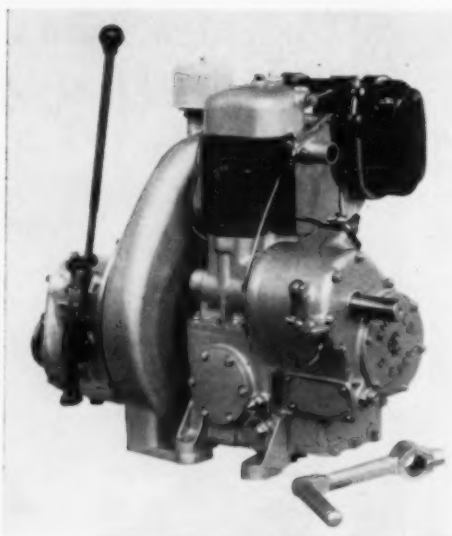
Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

### New Small British Air-Cooled Designs

**T**WO new air-cooled engines, both single-cylinder units, have recently made their appearance from different British manufacturers. The smaller of the two, a 3 in. bore, 3 in. stroke, 350 cc. design, is by Enfield's Industrial Engines Ltd. of Redditch and is intended essentially for marine applications. It is known as the M350 and has a continuous rating of up to 4.1 shp at 3000 rpm. It operates at the unusually high compression ratio of 23:1.

By the use of aluminum and light alloys, the dry weight has been kept down to around 250 lbs., and the manufacturers give the fuel consumption as 0.38 pints per bhp per hour at 1500 to 1800 revolutions per minute.

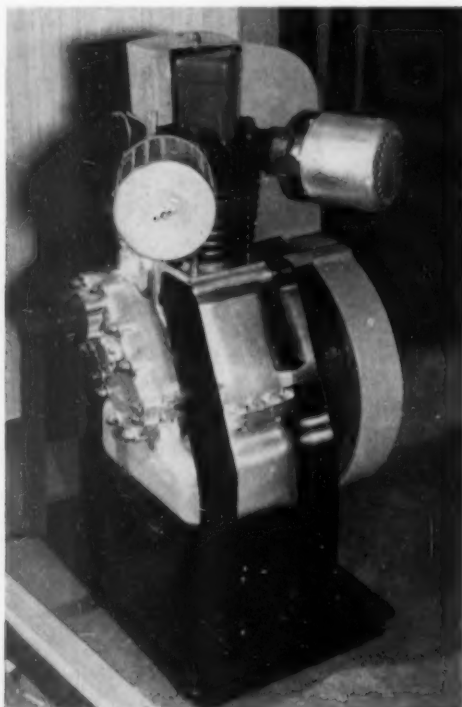
A simple layout essential to this type of small marine unit has been achieved, enabling easy access to all parts requiring regular inspection, service or removal. Engine starting, speed adjusting, refuel-



New Enfield M350 Marine diesel

by S. E. Opperman Ltd. Only brief details have to date been released on this new engine, but it is intended to operate on alternative fuels, including diesel oil, paraffin, petrol or tractor vaporising oil. The power range covered by the Elstree design is from 3 to 12 bhp for industrial use at 1200 to 3500 rpm, and outputs of up to 17.5 bhp are attainable at speeds of up to 5000 rpm for automotive purposes. This is probably the fastest-running catalogued speed of any diesel engine currently in production. Aluminum has again been used extensively in this air-cooled design. The engine's dry weight is given as 90 lbs. in the case of the automotive version and 110 lbs. in its industrial form. The latter form includes fan, cowling silencer, starting handle, fuel tank and air filter.

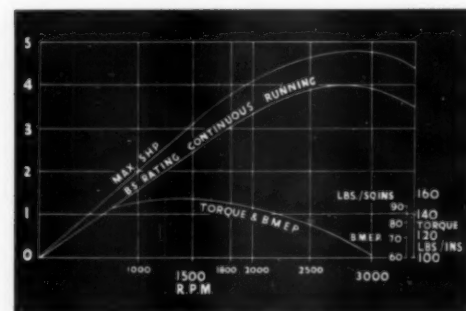
S. E. Opperman's 460cc. Elstree



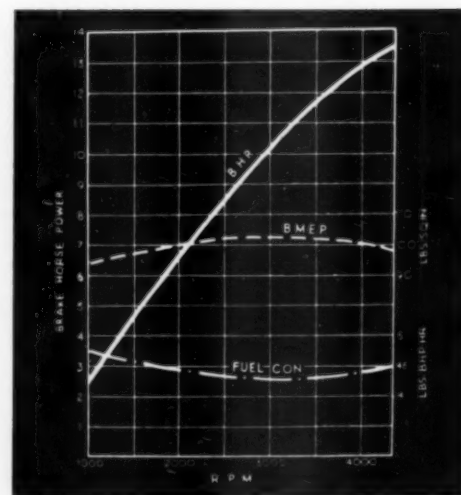
ing, sump draining, lubrication and other routine jobs can be accomplished with little hindrance and the mounting is arranged so that it does not restrict in any way the engine's accessibility. The familiar advantages of air cooling are particularly emphasized on an application of this type where the risk of clogged filters, cooling systems and other problems associated with water-cooled engines are more likely to occur.

The reverse gear is also of new and interesting design, an important feature being that clutch wear is automatically compensated. The two heavy-duty multi-plate clutches run in oil and permit 100 per cent power transmission ahead or astern. Ratios of 3:1, 2:1 and 1:1 are available. The gear-box is spigoted into flywheel housing. Other standard equipment includes a flywheel fan, paper-element air cleaner, fuel and lubricating oil filters, 1 1/4 gal. fuel tank, detachable starting handle and a variable speed governor control. Unified screw threads are used throughout the design.

The second new air-cooled design is known as the Elstree diesel engine of 460 cc. capacity. Cylinder dimensions are 3 in. bore by 4 in. stroke. The unit is manufactured at Boreham Wood, Hertfordshire,



M350 engine curves



Elstree engine curves

DIESEL PROGRESS



## Cleveland Diesel Names Trainer To Head Sales



Horace G. Trainer

Appointment of Mr. Horace G. Trainer as general sales manager of the Cleveland Diesel Engine Division, General Motors Corp., was announced July 1 by Mr. Thomas E. Hughes, division general manager. Trainer succeeds Mr. K. O. Keel, who is retiring after 40 years' service. Trainer joined Cleveland Diesel Engine Division in October 1934, and from 1935 until 1953 was its representative for submarines at Portsmouth, N.H., and New London, Conn. He returned to Cleveland as sales application engineer. He was executive engineer from January to November 1957, when he was appointed assistant general sales manager. Trainer was graduated from the United States Naval Academy in 1925. He retired from the navy in 1934 and completed that year a post-graduate course in mechanical engineering at the University of California. Keel, Cleveland Diesel's general sales manager since September 1957, was first employed by the Winton Engine and Mfg. Co., predecessor company of Cleveland Diesel. Prior to his appointment as general sales manager, he held the positions of chief engineer and government sales manager.

## Hercules Names Humphrey Director of Sales



W. F. Humphrey

Mr. William F. Humphrey, midwest district sales manager for Hercules Motors Corp., has been promoted to director of sales, President William L. Pringle has announced. Humphrey joined Hercules as branch manager in Salem, Ill., in 1940, and transferred to Kilgore, Texas, in the same capacity the following year. He later served as branch manager in Houston and Los Angeles, manager of West Coast retail sales (in Los Angeles) from 1949 to 1954, manager of the oilfield sales division, with headquarters at Houston, and midwest district sales manager (in Milwaukee) from 1954 to 1959. He attended Southern Illinois University and the University of Illinois before joining Hercules. He is a member of the Society of Automotive Engineers and of the group's tractor section auxiliary.

## Dodge and Dybvig Promoted at Dana

Mr. L. L. Dodge has been elected vice president-administration and C. C. Dybvig vice-president-sales at Dana Corp. Mr. Dodge, a veteran of more than 30 years in the automotive industry, most recently was assistant general sales manager at Dana, headquarters of which are in Toledo. He joined Dana in 1948 on special assignment to the president, then became the latter's executive assistant in 1950. Appointed director of planning and budgets in 1953, he was the originator of a



L. L. Dodge



C. C. Dybvig

cost control and budgeting plan that earned national recognition for its efficiency. Prior to joining Dana he had for 22 years served in various financial posts with General Motors Corp., filling

key auditing and other financial assignments in numerous cities and G. M. plants. Dybvig joined the Toledo-based firm in 1954 as general sales manager. A graduate of the University of Michigan, in 1931 he joined Firestone Tire and Rubber Co. serving first in the service department. In 1934 he was transferred to that company's Philadelphia district office where he was truck tire manager from 1938 to the start of World War II. After serving in Firestone's development department throughout the war, Dybvig became resident engineer in Detroit, the post he left to become associated with Dana. He served on the Detroit Section Governing Board of the Society of Automotive Engineers for seven years prior to becoming chairman of that body for the 1956-1957 term.

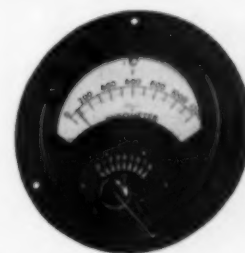
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# DIESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

## Promoting the Service Operation

**T**O establish an effective merchandising program for an engine or equipment service operation, one of the important factors to be considered is: What influences the amount of the service commodity each owner will purchase? Among the answers will be such items as the age of the engine or equipment, the owner's ability to pay, location of the service establishment in relation to the owner's operation, the owner's buying habits, the service department's facilities, the completeness of the services offered, product needs, seasonal needs, the owner's standard of maintenance and the service operation's ability to sell.

While many of these factors may be beyond the control of the service establishment, such items as the service department's facilities, the completeness of services offered and product needs can be controlled and used advantageously to influence a potential service customer. Service management must concentrate on these controllable items while planning a merchandising program aimed at influencing an owner to purchase all of his service needs. As for the other answers, it is doubtful whether many would be known unless accurate records are maintained pertaining to the past services purchased.

The entire operation of a distributorship or dealership can exert a favorable, or unfavorable, influence on a potential customer. The outside appearance of the building, its location and surroundings may encourage or discourage patronage. Certainly, the appearance and orderliness of the shop operation, and the treatment a potential customer receives is of considerable importance. The ability, appearance and general attitude of the personnel, as well as the relationship they maintain with customers, is an influencing factor that could govern the amount of service purchased. All of these features, and the good reputation for prompt, quality service are favorable assets which exert strong influence on customers.

Of the many responsibilities of service management, one of the most important is the establishment's service merchandising activities. Even

though an operation may have a large service potential, an ample stock of parts and service commodity, a well-trained service and selling organization and a well-planned, modern place of business, they are useless without customers. Therefore, it must be decided: when is an owner a customer? The owner is merely a prospect or potential customer until he is in the place of business and is exposed to its sales efforts.

## Advertising Media

Advertising, in its many forms, is the organized use of various means of communication to bring products and commodities to the favorable attention of prospective purchasers. Properly planned, it offers a service establishment a means of transmitting information about its facilities and its operation, and it makes appeals to owners to purchase its commodities. Advertising is generally planned to control a more even flow of work through the shop to avoid peak loads or alleviate lulls in the operation. An overall, continuing advertising program will have an effectiveness that will be long range.

Staggered advertising, generally aimed at specific owners and set up for limited periods, is often considered a low-budget, shot-in-the-arm form of promotion. General advertising and its cost must be considered in relation to the total business volume instead of its relation to specific customer groups. A general form of advertising will not sell merchandise. It only arouses an interest or desire for that which is offered and may condition the potential customer's mind to consider favorably the commodity available at a place of business. These features must be carefully weighed and evaluated from every conceivable angle when planning an effective merchandising approach.

Properly planned service advertising will be more effective if it is designed to help a user rather than "high pressure" him into the purchase of a commodity. Failure to consider this important factor could easily result in the failure of an advertising campaign. During the initial develop-

ment of an advertising program, two important features must be carefully evaluated: 1, what will be offered and 2, through what manner or medium will it be offered. The "what" factor can easily be determined because people have a tendency to forget; thus, periodic inspections and regular maintenance checks are desirable features of a merchandising program. To remind owners of their needs is one of the objectives of a well-planned program. One of the secondary objectives is for a user to have a ready reference so that he can call at once if emergency service is needed.

The "how" factor of a merchandising plan can be supplied through any of the many media available. The proper selection of the medium which will best fulfill the needs will depend upon the type of users, their methods of operation and local conditions. The medium used should meet certain fundamental requirements such as: attract favorable attention; clearly state what is for sale; create an interest; invite a visit or demonstration; and stimulate a sale. While there are many "pros and cons" of various forms of advertising, an alert manager should be able to determine the form that best meets his particular requirements. Some of the ways to advertise the facilities of a service operation, include: letters, newspapers, local trade publications, signs, telephone solicitations, personal contacts and novelties. They come under one of two classifications. One type is suitable for reaching large groups and the other can be directed to individuals. The media usually used to reach large groups are newspapers, signs and displays. Each has advantages when properly used.

Newspaper advertising is of a general nature and is generally considered the form best suited to reach the public. While this form may not be the most effective method for reaching a select clientele, its advantages include: quick coverage of a large area; can be changed easily; low cost per user reached; and frequency of publication. A newspaper is extremely valuable to announce a change in location, opening of new quarters, personnel changes and promotion of seasonal programs. It should be realized, however, that because

of the general nature of a newspaper, only a small part of the potential audience for which the ad is intended may actually see it. The cost per user contact could be higher than other media.

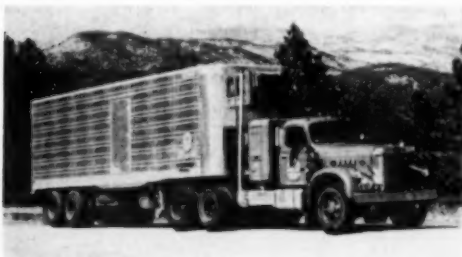
Signs can be used effectively in the diesel engine and equipment industries. The most common are road signs, building signs and those on trucks and vehicles. Effectiveness of signs as an advertising medium is influenced by their general appearance, location and the concise message they feature. Unsightly signs detract from favorable customer impression. Advantages in the use of proper signs as an advertising medium include: they are seen by many; can be designed to meet various requirements; and identify commodities the business offers.

Displays can be utilized for maximum effectiveness. One aggressive, service-minded organization displays a scale model of the entire service shop operation in the middle of its showroom. This attracts many customers during their visit to the establishment to inspect new equipment.

Effectiveness of the many forms of advertising may vary in different sections of the country or even in different communities and may also be governed by the seasons. The engine or equipment owner who is classified as a service customer may be impressed by an ad in an entirely different manner than one who has never been a customer. The necessity of varying the type of advertising to appeal to various customer classifications can improve the effectiveness of a total merchandising program.

#### Diesels Swell Scott Fleet

Five more new Diamond T diesels are now flying the flag of Scott Truck Line, well known Denver-based carrier of foodstuffs. The operator of this growing fleet specializes in transporting fresh meat and other perishable products from Colorado to the Mid-west, and has operating rights in Nebraska, Iowa, Illinois, Wisconsin and Michigan. Scott has established an enviable reputation for on-schedule deliveries. Scott chose model 923F-SLHD's, Diamond T's newest diesel model which



is powered with the recently introduced Cummins NT-180 diesel engine. It develops 180 bhp at 2100 rpm and 504 lbs. ft. torque. This addition to the carrier's rolling stock is the latest expansion of the firm which was founded by E. S. Hilliker, now president. From a modest two truck start only ten years ago, the company has grown until it now employs some seventy-five people. Included in the specifications of Scott's 923F-SLHD's are the following heavy-duty, road-proven components: Timken FE900 front axle, Cummins NH-180 diesel engine, Fuller R96 RoadRanger transmission and Spicer 14 in. two-plate clutch.

AUGUST 1959

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## Florida Diesel News

By Ed Dennis

THE *Sands of Time*, a twin screw 49 ft. Holland-built yacht, was recently repowered from gasoline to GM Diesel V8-71's, the first production line V8's in Florida for marine use 1.1:1 Allison Tormatic Marine r&r gears, 1.62:1 Walters "V" drive, by Ellis Diesel Sales & Service, Fort Lauderdale.

MODEL OM321 Mercedes-Benz diesel rated 96 hp at 2600 rpm was recently installed in an International NL160 milk delivery truck for the McArthur Dairy Co. This repowering job also included a Clark five-speed transmission and a Long clutch.

CUMMINS diesel engines, model JN-6, each rated 175 hp at 2500 rpm, were included in the recently acquired Galion 500 motor grader, by the Volusia County Commissioners, and in an International 200 tractor, by the Gold Kist Pecan Co., Waycross, Ga.

THE *Seaquarium*, a 72 ft. craft built for collecting live marine specimens for the Miami Seaquarium, has for main propulsion two GM 6-110 diesel engines, each rated 220 hp at 1800 rpm, and Allison 2:1 marine gears for a speed of 17 mph. Perry water filters are installed on each engine.

THE *Rut Cry II*, a 35 ft. twin screw, commercial sportfisher craft, was repowered from gasoline engines to Volvo MD47 marine diesel engines. This new diesel engine has a marine output of 82 bhp at 2500 rpm. Also included was a Snow-Nabstedt, 2:1, manual, water-cooled r&r gear. Engineered by J. Frank Knorr Co., Miami, for Capt. Jack Van Fleet, Pompano Beach.

TWO of the first new No. 14 Caterpillar motor Graders, powered by Caterpillar 150 hp turbocharged diesel engines, were delivered to Magnuson Properties, developer of Florida Shores, and Linke-Smith Inc., Pompano Beach. The new graders have a Cat-built oil clutch, power assisted brakes, power steering and 16.00 x24 tubeless tires.

TWO Witte diesel engines power deck machinery on the 140 ft. *Inagua Rover*. These 1 cylinder diesels are rated 4 hp at 1200 rpm. Main propulsion is provided by a pair of D375 Caterpillar diesel engines and 3:1 Snow Nabstedt r&r gears.

FOR the C. E. L. Hydroelectric plant at El Salvador, Salvador, a service machinery firm. Dixie 32x18 portable dredge, powered with a D397 series H Caterpillar diesel and a Maddox 8 in. pump,

plus a D318 Cat for auxiliary use. Capacity: 120 cu. yd. of sand and water per hour; shipped on the *Inagua Rover*.

WEST Palm Beach: R. Hoffman took delivery of a P&H 455-C 1 yd. dragline; powered by a 487C-18 two-cycle P&H diesel engine rated 126 cont. hp at 1800 rpm with a Cotter transmission; for use in a shell pit.

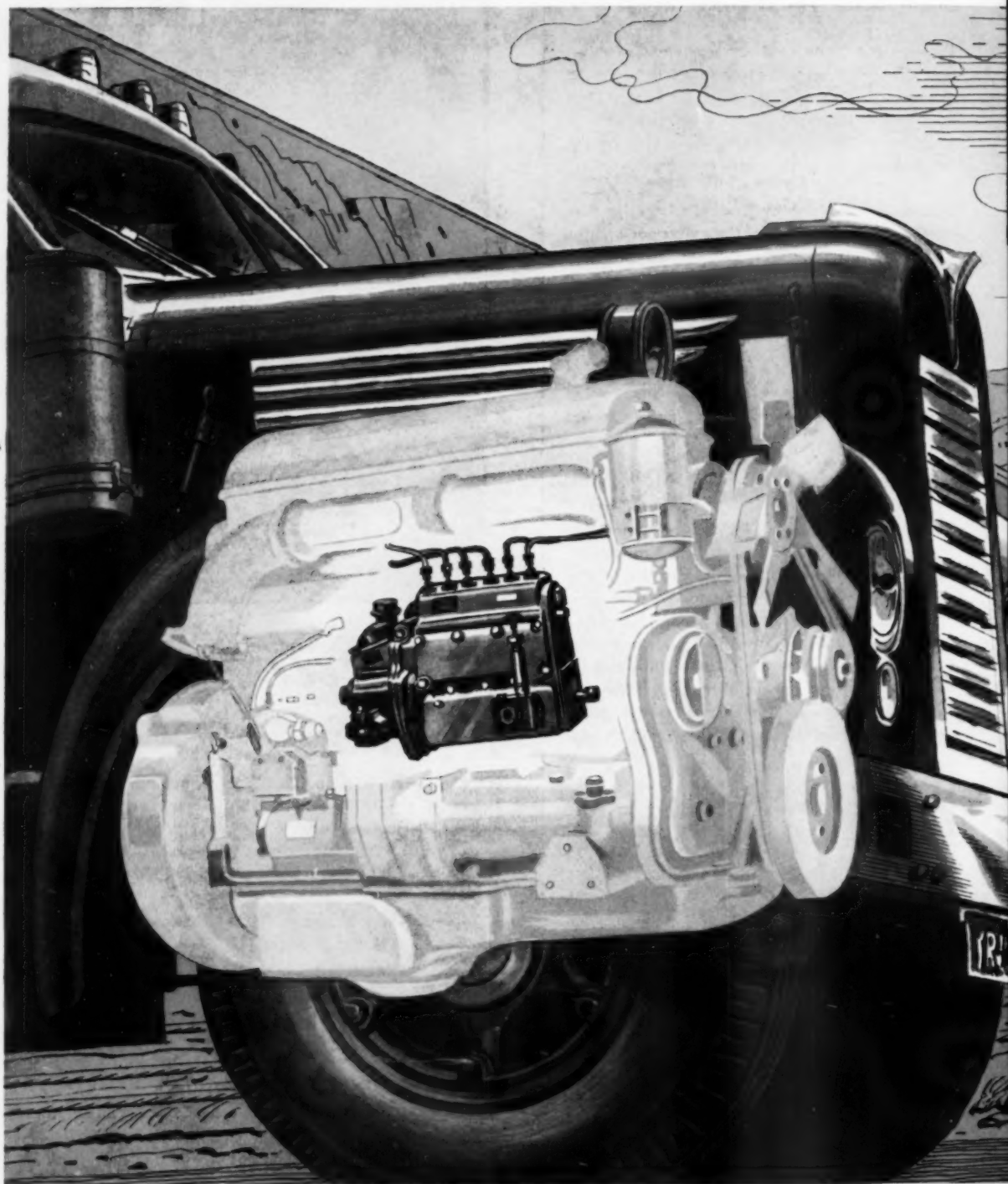
FLORIDA-Georgia Tractor Co. delivered to the Rockdale Stone Co. a Hough H90 Payloader tractor shovel powered with a Cummins JN-6-B1 diesel engine and Allison 3.5:1 torqmatic transmission. A similar model went to the Seminole Rock Co.

TWO-Cycle Petter diesel engines, each rated 12 bhp, drive the model 325

Quincy air compressors on the newly launched *Inagua Cay* and *Inagua Cloud*. Both are owned by the West India Shipping Co.

SHELLEY Tractor & Equipment Co. delivered to the David M. Woolin & Co. housing development, Perrine, a D8 Caterpillar dozer, 191 hp; and to Linke-Smith at Coral Park housing develop-

## 28 times around the world



## ...and AMERICAN BOSCH IS



ment, two No. 12 motor graders, 115 hp, and a DW21 tractor, 300 hp, with a No. 470 scraper.

REPOWERING from gasoline to diesel, the Murphy-Cooper Co., Princeton, took delivery of a model 321 Mercedes-Benz diesel, rated 96 hp, to power a Gorman-Rupp H55 irrigation water pump in the Redlands.

FOR the 41 ft. sportfisherman, *T. Jay*, built at Chris Boat Yard, two GM Diesel 4-71's inclined, each rated 151 hp at 2300 rpm with Paragon 2:1 hydraulic reverse reduction gears.

NEAR Orlando, the Hubbard Construction Co. is using two S-12 Euclid scrapers with GM 6-71 diesels and Fuller transmissions, along with a No. 200

Allis-Chalmers scraper. These are being push loaded by a couple of HD-21 Allis-Chalmers dozers with Allis-Chalmers HDT844 turbocharged 225 hp diesels, on road construction work.

TWO model OM636 Mercedes-Benz diesel generating sets were installed on the 72x19 ft. *Seaquarium* with a 7.5 kw 120 volt 26 amp Onan generator.

THE *Jacks Bay*, recently acquired by the Caribbean-Hamberg Line, Inc. has for main propulsion two General Motors 12-567 diesel engines, 900 bhp at 744 rpm, and Falk r&r gears. A couple of Caterpillar diesel generating sets, 40 kw and 75 kw, supply the necessary electrical power for this West Indies freighter.

ELLIS Diesel Sales & Service of Fort Lauderdale has moved to new and larger quarters which include 14,000 sq. ft. undercover, four covered 100 ft. slips and 325 ft. frontage on the New River in the heart of Fort Lauderdale. They are the Broward County distributors for the marine and industrial line of General Motors diesel engines.

INSTALLED at the West Palm Beach plant of Pratt & Whitney Aircraft Co., a Cummins NHS-6-I supercharged diesel engine, 290 hp at 2100 rpm, to supply power for a Peerless standby fire pump. The Sample Rock Co., of Opa Locka, took delivery of a Cedarapids rock crusher with an HR-6 Cummins diesel, 175 hp at 1800 rpm.

TWO Mercedes-Benz diesel engines, model OM326, each rated 175 hp at 2000 rpm, were installed with Capital 2:1 hydraulic r&r gears in a Grayline Tours sightseeing vessel at the Mt. Pleasant Boat Works, Charleston, S. C.

#### Portable Diesel-Driven Compressor

Ingersoll-Rand has recently announced its 125-cfm Gyro-Flo portable rotary compressor. Smaller and more compact than the original Gyro-Flo 125, the new unit incorporates many of the proven Gyro-Flo design features plus a host of new features which are the result of extensive research, performance evaluation and customer suggestions. Some of the features listed by the manufacturer for their new Gyro-Flo 125 are: simplified, more efficient compressor system . . . automatic drainage of oil from cylinders when unit is shut down . . . larger, more-powerful engines . . . slower speed . . . safety shut-down on compressor . . . provision for inspection of all rotor vanes . . . fuel and air tanks under housing and lockable cover . . . fold-back, safely out-of-way side covers . . . full-length tool boxes with more storage capacity . . . and 60 in. track for greater stability on rough terrain. The new portable is 10 ft. 1 in. long including drawbar and weighs 2442 pounds ready to run. Power for the new 125-cfm size is supplied by 1800-rpm Continental diesel Red Seal engines. It is available with 2-wheel mounting or less running-gear for truck or skid mounting. For additional information write Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., and request Form 2930.

## without an overhaul !

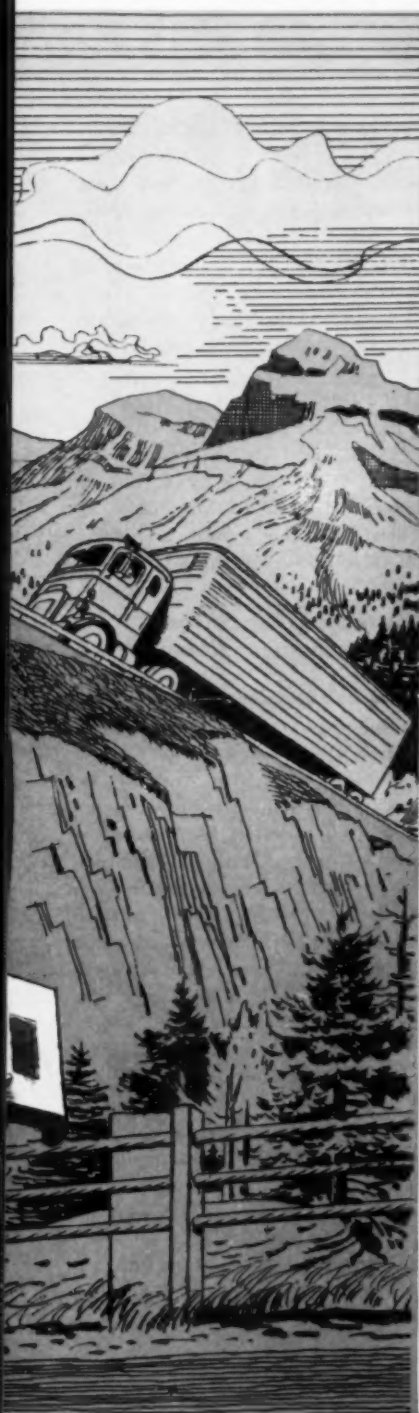
**S**even hundred thousand miles of heavy duty hauling—equivalent to 28 times around the world—without a major engine job! Two major trucking lines report that diesels equipped with American Bosch fuel-injection systems have rolled up this remarkable mileage.

Wherever diesels move, they move with American Bosch fuel-injection systems—systems that feed exactly the right metered amount of fuel, with split-second precision, thousands of times per minute. American Bosch is the largest independent producer of diesel fuel-injection systems in the Nation.

American Bosch fuel-injection systems are used as original equipment by the following diesel manufacturers: Mack, Allis-Chalmers, Alco, International Harvester, J. I. Case, Waukesha, John Deere, Minneapolis-Moline, Continental, Hercules, Dominion Engineering, White, Worthington, Cooper-Bessemer, Nordberg, Oliver, Chicago Pneumatic, Baldwin-Lima-Hamilton, American Marc, Witte, Fairbanks-Morse and many others.

Fuel-injection systems are only one of many important industrial, consumer and defense products made by American Bosch: hydraulic starting systems, actuating motors, pulse generators, magnetos, windshield wipers and many more. American Bosch, Springfield, Massachusetts, a division of American Bosch Arma Corporation.

**AMERICAN BOSCH ARMA**  
C O R P O R A T I O N



## THE HEART OF THE PICTURE

## Mid-West Diesel News

By L. H. Houck

KENWORTH truck, with Cummins diesel, Fuller transmission, for stock-hauling tractor-trailer fleet, to Montezuma Truck Lines, Durango, Colo.

DOHRN Transfer Co., Rock Island, Ill.,

has added 25 International AC-225-D tractors with NH-180 Cummins diesels and 10-speed Fuller RoadRanger transmissions, to its fleet.

OBSERVED: D A Lubricants, Indianapolis, Ind., making oil delivery to Navajo Dam, N. Mex., in a new Auto-car tractor with Cummins diesel and 10-speed RoadRanger transmission.

INLAND GM Diesel, Inc., Milwaukee, Wis., has delivered two matched sets of GM 12005A and 12006A twin diesels to Peterson Builders, Inc., Sturgeon Bay, Wis. These 880 hp plants will be used to drive 63 ft. crew boats.

ARING Equipment Co., Milwaukee, Wis., has purchased a GM 3055C diesel from Inland GM Diesel, Inc., for repowering an Austin-Western grader.

DIESEL Energy Corp., New York, has sold a group of F1L 712 Deutz diesels for powering Model CK 10 Vibro-Plus rollers and some Deutz A2L 514's for Vibro-Plus CH-31 rollers. Rollers have been sent to construction jobs in New Mexico, Texas and Oklahoma.

BEING used on Interstate 70 and connecting service road construction near Columbia, Mo.: Crawl-IR blast hole drill with Ingersoll-Rand Gyro-Flo 600 cfm compressor, with 6-71 GM diesel; 2½ cu. yd. Northwest shovel with Murphy diesel; No. 25 Northwest crane with Caterpillar 318 diesel, all on job of Reno Construction Co., Overland Park, Kan.

LARGE single truck order, for perhaps 250 Mack diesel tractors with END-6-73 Mack Thermodyne diesels, placed by Mason & Dixon Lines, Kingsport, Tenn., costing \$3½ million. Tractors are Mack Model B-67T with Mack transmissions.

FROZEN Food Express, Dallas, Texas, has added 10 Kenworth K-522, 86-in. tilt-cab diesels to its fleet. Diesels are Cummins; tandem axle with drive to rear axle only.

FORD diesel tractor on rubber to Riverside Corp., general construction contractors, Farmington, N. M. Has Sherman back hoe for trench work.

HUSMANN & Roper Freight Lines, recently expanding with the purchase of several smaller lines, including Schien's, Sedalia, Mo., has purchased 10 International tractors, Model DCOT-405, with Cummins NH-180 diesels, 72-in. cabs, 10-speed RoadRanger transmissions, side-mounted 150-gal. fuel tanks, V-belt pusher axles with Page & Page suspension, 45-55 wt. distribution.

TAMPO Mfg. Co., San Antonio, Tex., manufacturer of compaction rollers, has installed a number of Deutz F2L 712 engines on some of its models.

RIVERSIDE Corp., general contractor, Farmington, N. M., has purchased a new 405 Koehring crane with a 6-71 GM diesel.

MONTEZUMA Truck Lines, Durango, Colo., has put a new Mack diesel tractor

in service—has Thermodyne diesel engine, 10-speed RoadRanger transmission for pulling livestock trailers in mountain areas.

TWO Caterpillar Series HD8 dozers, latest models, to St. Louis County Bridge & Grading Co., (Fred Weber), and one new No. 14 Caterpillar motor grader, for use on the company's \$3,374,542 road construction contract on Interstate 44. Equipment sold by Fabick Tractor Co., St. Louis, Mo.

MICHIGAN-Nebraska Transit, Council Bluffs, Iowa, has repowered a Kenworth with a Cummins NH-220, from Cummins Mid-West Co., Inc., Omaha.

LYGHT Bros. Trucking Co., Lustin, Minn., a Cummins NH-220 for repowering a Kenworth CA-524, from Cummins Diesel Sales Corp., Hibbing, Minn.

LOWE Machine Co., manufacturer of farm equipment has purchased a new GM 4-53 diesel to drive an alfalfa harvester. Inland GM Diesel made the sale.

DEUTZ F6L 712 to E. J. Longyear, Minneapolis, to power a drill.


CONSUMERS Co., Racine, Wis., a Cummins HR-6-BI for installation in a Euclid 36FD dump truck, from Cummins Diesel of Wisconsin, Inc.

### Construction Begins for Diesel Equipment Company

Construction has started on a new \$100,000 building for the Diesel Equipment Co. of Wichita, distributor of General Motors diesel engines in Western Kansas. The new building will be located at 4501 Irving, west of US Highway 54 and West Street, in Wichita, where complete sales, parts and servicing facilities will be established. Official ground breaking ceremonies at the new site took place in April. The new building will provide 12,000 sq. ft. of floor space with servicing facilities that include a unique overhead crane system for efficient handling within the shop and a special bay for accommodating engine servicing on large highway trucks. Present address of the company is 355 N. Washington.

### Vernon Hill Named to Staff

Cummins Engine Company has announced the appointment of Vernon Hill to its sales staff. Mr. Hill will specialize in the construction market, contacting manufacturers, contractors and other power users in the construction and mining fields. His area will be the midwestern United States and central Canada. He has been associated with the construction and mining industries for 13 years.



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**COOLS NUCLEAR TEST REACTOR**

This Stainless Steel Horizontal Atmospheric Cooler by Young at Knolls Atomic Power Laboratory is specially engineered and fabricated for cooling water used in the nuclear proof test reactor.

YOUNG engineers specially designed this atmospheric cooler to comply with the rigid specifications set by the A.E.C. The first nuclear test reactor duplicating temperature and pressure conditions of a full scale pressurized water power reactor has been placed in operation by General Electric at Knolls Atomic Power Laboratory (KAPL). A stainless steel horizontal atmospheric cooler by Young cools reactor water which reaches temperatures of 550F. and pressures up to 1250 psi.

The unusual is routine for Young's team of Heat Transfer experts. Their Design, Engineering and Fabrication ability are part of your staff when you call upon Young. Write today for assistance with your current or anticipated Heat Transfer requirements. No obligation, of course.

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POSITIVE CHECK  
ON AIR CLEANER  
EFFICIENCY

IN ONLY **40** SECONDS

**MAINTENANCE  
MINDER**

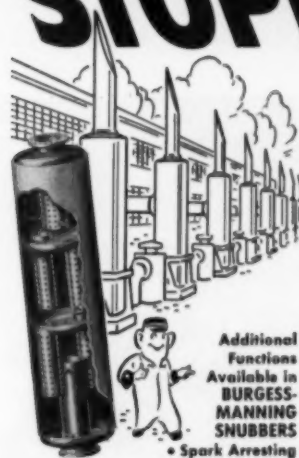
COMPACT  
EASY-TO-USE  
DURABLE

Maintenance Minder is a proven testing gauge designed to test the efficiency of air filtering systems with ease and speed. Used regularly, you can determine exactly when filters need cleaning. Eliminates guesswork, keeps your engines breathing easily. Prevents the possibility that dirty filters are letting dust and abrasive particles into the combustion chamber. Only \$19.75 . . . it can save you hundreds of dollars.

Maintenance Minder, Dept. P-4

5425 Second Ave., Des Moines, Iowa

## EXHAUST NOISE STOPPED!



Stop nerve-racking, efficiency-destroying exhaust or intake noise. Your engine can be effectively silenced with Burgess-Manning Snubbers.

Don't tolerate this costly nuisance that leads to problems of impaired employee and neighbor relations, liability claims, losses in efficiency and production mistakes.

Burgess-Manning engineers specialize in the elimination of noise, and of dangerous pulsation-produced vibration in closed gas piping systems. Tell us your problem—we will gladly recommend a solution.

Additional  
Functions  
Available in  
**BURGESS-  
MANNING  
SNUBBERS**

- Spark Arresting
- Water Separation
- Heat Recovery
- Air Cleaning



**BURGESS-MANNING COMPANY**

Sound Engineering Industrial Silencer Division

9211 Sovereign Row, Dallas, Texas  
Libertyville, Ill.

## DEVELOPED THROUGH RESEARCH • PROVEN IN USE



Intensive research by American MARC brings you the benefits of ultra-lightweight diesel power in a small package. American MARC products include: Ultra-lightweight diesel engines, 7 to 16 HP, air and water cooled; Diesel electric generator sets, 2½ to 10 KW, AC and DC; Generators, ½ to 100 KW, 400 and 60 cycle, permanent magnet and static excited types; Natural gas engines, 2 cylinder, 15 HP, air cooled.

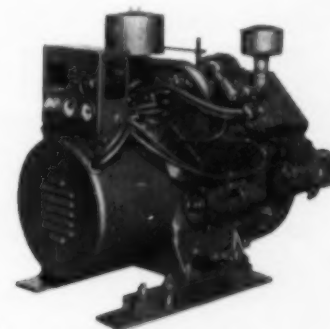
American MARC products are designed and

built in AMERICA. Quality American materials and expert workmanship assure you of economical, trouble-free operation. The AMARC unconditional guarantee is supported by prompt service and ready availability of genuine American MARC parts.

Our armed services specify only American products. Demanding positive dependability, they have standardized on AMARC diesel equipment.



Diesel Engines from 7 to 16 HP, Air and Water Cooled — Natural Gas Engines 15 HP, Air Cooled.



Diesel Electric Generating Sets from 2½ to 10 KW, AC and DC—Generators from ½ to 100 KW.

**AMERICAN MARC, INC.**

Dept. DP1 • 1601 W. Florence Avenue, Inglewood, California



## Southwest Diesel

### Notes

By Donald M. Taylor

THE General Engineering Corp. of Ft. Worth, Texas, purchased a Stewart & Stevenson model 12GD, 265 kw, ac generator set for emergency lighting in the

Harris Hospital, Ft. Worth. Powered by GM twin 6-71's, the unit will automatically take over when needed.

OHIO Oil Co. purchased a GM twin 6-71 model 12103, 300 hp diesel unit from Stewart & Stevenson Services, Inc., of Houston, Texas.

CAMDRILL International, Inc., Los

Angeles, purchased a Stewart & Stevenson 6 GD-66 ac generator set. The 66-kw unit is powered by a GM 71 model 6030C engine.

MIDWEST Drilling Co., Mission, Kan., installed a new NHRS-6-BI Cummins diesel engine on a U-15 Unit drilling rig. Cummins Sales & Service, Inc., Ft. Worth, supplied the 320 hp engine.

SCOTT Truck Lines, Hutchinson, Kan., repowered a Mack LTL5W truck with a Cummins NH-220-B diesel. Cummins Sales & Service, Inc., Ft. Worth, made the sale.

MISSILE Division of Chrysler Corp. recently ordered 17 Stewart & Stevenson 30 kw special 400-cycle generator sets powered by three cylinder series 71 model 3030C GM diesels.

CARDWELL Mfg. Co., Wichita, Kan., manufacturer of portable drilling rigs, will install a Stewart & Stevenson oil-field utility generator set on a new unit. The 20 kw generator set also includes a washdown pump and fuel transfer pump.

EMERGENCY lighting for runways at the Naval Air Station, Meridian, Miss., was installed by Grimes Electric Co., San Antonio, Texas. The company installed two Stewart & Stevenson model 110-GD, 250 kw generator sets powered by GM series 110 model 122406 diesels.

CUMMINS diesel generating unit, NHRBIS-600-GA, will power the new Cedarapids rock crusher owned by Asphalt Sand & Gravel Corp., Farmington, N. M. Cummins Sales & Service, Inc. of Farmington made the sale.

TODD Shipyards Corp., Products Division, recently bought two Petter model DC 3000 generator sets. The units are powered by one-cylinder Petter diesels. Stewart & Stevenson supplied the units.

DUPONT Fabricators, Morgan City, La., took delivery on one Stewart & Stevenson model 2GD-20 ac generator set. A GM series 71 two-cylinder 2030C supplies the power.

REPLACING a gasoline engine in an IHC tandem used for hauling earthmoving equipment, Parker & Parker, Inc., Odessa, Texas, has installed a JT-6-B Cummins diesel rated at 175 hp. Cummins Sales & Service, Inc., Odessa, supplied the new engine.

BRITT Trucking Co., Lamesa, Texas, has installed a 175 hp JNS-6-B Cummins diesel engine in an R-212 International Harvester single-axle oil field truck. Cummins Sales & Service, Inc., Odessa, Texas, made the sale.

BILL Hodges Trucking Co., Oklahoma City, Okla., has installed a 220 hp NH-220 Cummins diesel in a DC-75 Autocar truck. Cummins Sales & Service, Inc., Oklahoma City, was the seller.

THREE new 320 hp Cummins NHRS-6-IP diesel engines are now providing the power for a three-engine compound on a Unit U-15 drilling rig belonging to Mid Western Drillers Co., Tulsa. This order was filled by Cummins Sales & Service, Inc., Oklahoma City.

CUMMINS Sales & Service, Inc., Oklahoma City, sold Jelley Reaves Drilling Co., Cushing, Okla., a 300 hp NRT-6-IP Cummins diesel to power a National C-150-B mud pump.

BROWN & Root, Houston (Texas) engineering and construction company, has purchased two GM series 71 four-cylinder model 4031C, closed-type diesel units from Stewart & Stevenson Services, Inc., Houston.

HOFFARS Ltd., of Vancouver, B.C., took delivery on two GM series 71 two-cylinder 2055 diesel engines from Stewart & Stevenson Services, Inc.

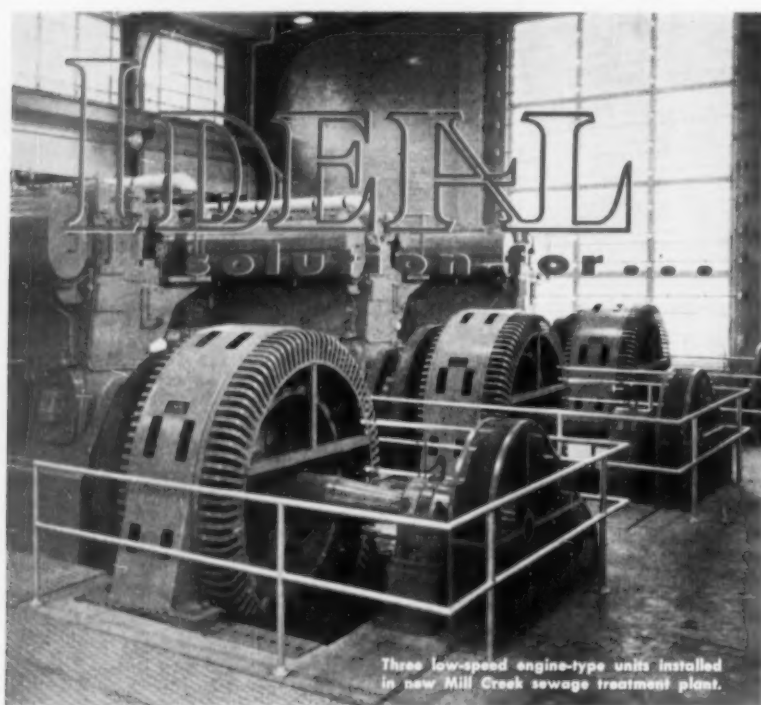
TO Bayou Boeuf in south Louisiana have gone two HRS-6-IP Cummins diesels to power two yard cranes belonging to McDermott Fabricators. Cummins Sales & Service, Inc., Ft. Worth, made the sale.

SHRIMP boats a' comin' three at a clip, with new 172 hp HRS-6-M Cummins engines. Cruso Canning Co., Biloxi, Miss., bought a new engine from Cummins Sales & Service, Inc., for each of these shrimp boats: *Mary*, *Capt. Bill* and the *Azalea*.

### Filter Catalog Color-Coded

A new color-coded master catalog of Wix oil and air filter cartridges is now available, says Norman Hull-Ryde, sales promotion manager of the Wix Corporation, Gastonia, N. C. This 110 page catalog covers the entire line of Wix "Engineered Filtration" for cars, trucks, buses, tractors, marine and stationary engines. Additionally, an exceptionally broad coverage of replacement cartridges for popular foreign cars is listed, as well as a complete selection for diesel engines that power heavy construction equipment. A special feature is the use of colored page edges for quick and easy identification of the various sections that include: cross reference, replacement cartridges, manufacturers' part numbers, gaskets, oil lines, etc. According to the manufacturer, this master catalog gives an up-to-date roundup of all the applications of the full Wix line.

(ITS NEW)



Three low-speed engine-type units installed in new Mill Creek sewage treatment plant.

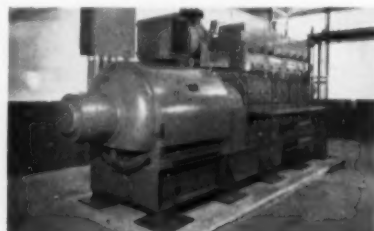
## ideal performance

Four outstanding reasons why IDEAL Generators are best suited to your specific generating requirements:

- **CUSTOM DESIGN** — each unit engineered to your specifications with ample capacity to withstand overloads for extended periods.
- **LONGER LIFE** — many units installed 30 to 40 years ago are still in operation and provide dependable, trouble-free service.
- **PROVEN ECONOMY** — power plants equipped with IDEAL Generators have won REA Economy Awards three years running. Hundreds of other units show substantial savings in operation and maintenance.
- **SERVICE** — 147 IDEAL sales and service offices, strategically located across the nation, stand ready to serve you.

### UNIFIED RESPONSIBILITY

Low and high-speed types in ratings from 10 to 10,000 KW, with switchgear and controls for all applications. Extra emphasis on rugged construction, with a wide selection of insulations and a patented bearing design for simple, easy replacement.



EMERGENCY STANDBY—Typical high-speed unit installed on a diesel generating set in a Midwestern metropolitan telephone exchange.

Write for Bulletins 505 and 510

**The IDEAL ELECTRIC**  
& MANUFACTURING COMPANY  
307 East First Street  
Mansfield, Ohio

SINCE 1903, AMERICA'S FINEST MOTORS, GENERATORS,  
MOTOR-GENERATOR SETS, SWITCHGEAR AND CONTROLS

## Allis-Chalmers Acquires Tractomotive Corporation

Plans to acquire Tractomotive Corp., Deerfield, Ill. through an exchange of stock is announced by Allis-Chalmers Manufacturing Co. One of Tractomotive's principal product lines is a rubber-tired wheel loader called the Tractor-loader which is sold through Allis-Chalmers construction machinery dealers throughout the world. These units, equipped with shovels range in weight from 6,000 to 23,000 lbs. and are used in the construction, logging, mining, and pit and quarry industries. The Illinois company also manufactures front end shovels, rippers, side-booms for pipe-laying and log loading equipment for attachment to crawler tractors. Since 1945, when the Tractomotive Corporation was founded, it has been a major supplier of this equipment to Allis-Chalmers. Tractomotive Corp. will become part of the Allis-Chalmers Construction Machinery Division and complement production at the firm's Springfield, Ill. and Cedar Rapids, Ia. plants. Crawler tractors and motor graders are manufactured at Springfield and rubber-tired earth moving equipment at Cedar Rapids.

## Oil Spotlighted in Production Road

The spotlight is on oil in the current issue of *Production Road*, Twin Disc Clutch Company's quarterly magazine. The feature article, "Drake's Folly . . . the story of the First Gusher," commemorates the 100th anniversary of the petroleum industry in America. Another story is about a miniature drilling rig model that took its builder three years to make. It is valued at \$25,000. A tug-boat race in Detroit, a ship launching on the Manitowoc River and an apartment construction project in Montreal are also covered in *Production Road*, as well as such diverse subjects as laundry operation, asphalt production, earth moving and timber loading. A copy of the magazine may be obtained by writing The Editor, Twin Disc Clutch Co., Racine, Wis.

## New Bulletin Describes Clark Field Compressor Line

Bulletin 158 presents the design and operating features of the Clark Model CFA packaged field compressor line. Described and fully illustrated are: Balanced/opposed compressor; new positive direct drive; unitized, vertical air flow radiator; oil field engines driving the compressor at 1000 rpm speeds; piston speeds of 833 fpm; I-beam skid; and factory packaged assembly. Specifications are contained for the complete line of two and four compressor cylinder mod-

els built in a total of 15 sizes ranging from 100 to 350 bhp. For copies of Bulletin 158, write Clark Bros. Co., Division of Dresser Industries, Olean, N. Y.

ITS NEW

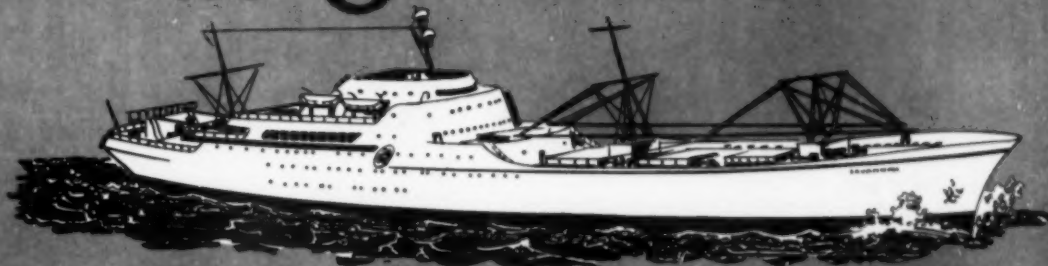
## American MARC Names Nowak Midwestern Manager

American MARC, Inc., Inglewood,

Calif., has appointed Mr. Frank A. Nowak as regional manager of its Midwestern Division. A native of Milwaukee, Wis., and a graduate mechanical engineer, Nowak most recently was sales manager of a large Midwestern supply company. He previously was a mechanical engineer with International Harvester Co. for 12 years. Nowak resides in Minneapolis, Minn.

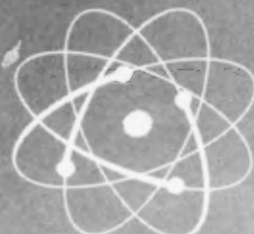
**NEW AND NOW AVAILABLE!** The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. LaCienega Blvd., Los Angeles 46, Calif.

# NS Savannah



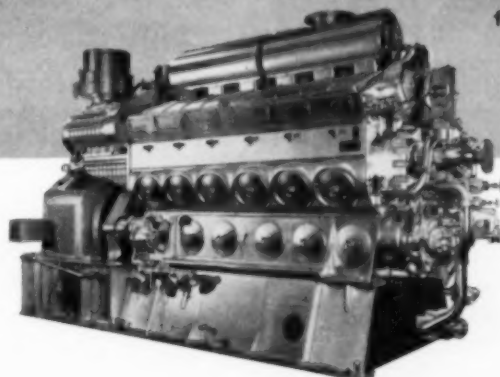
## 1<sup>st</sup> NUCLEAR POWERED PASSENGER-CARGO VESSEL

*... has Emergency Power supplied by General Motors Engines*



Two generator sets, built by the Cleveland Diesel Engine Division of General Motors, have been installed in the N. S. SAVANNAH. They provide automatic emergency service for reactor cooling, ship's service and ship propulsion.

This equipment has been selected because of Cleveland Diesel's 25 years' experience in supplying generator sets for this type of service in United States Navy and commercial ships.



Power for the emergency generator sets on the N. S. Savannah is supplied by two Model 12-567C General Motors Diesel Engines.



**CLEVELAND DIESEL**  
ENGINE DIVISION OF GENERAL MOTORS CORP.

### SALES AND SERVICE OFFICES:

Chicago, Ill.  
New Orleans, La.  
New York, N. Y.

Pittsburgh, Pa.  
Portland, Ore.  
St. Louis, Mo.  
San Diego, Calif.

San Francisco, Calif.  
Seattle, Wash.  
Wilmington, Calif.



## Locomotive Maintenance Group Meets in Chicago Sept. 21-23

Chicago's Hotel Sherman will be the scene Sept. 21-23 for the annual meeting of The Locomotive Maintenance Officers' Assn. Nine sessions are scheduled. An address by the association's president, Mr. E. V. Myers, superintendent

of the mechanical department, St. Louis-Southwestern Railway, will open the meeting at 10 a.m. Sept. 21.

Principal speaker at a luncheon honoring all railroad presidents at noon Sept. 22 will be Mr. W. T. Rice, president of the Atlantic Coast Line Railroad. Mr. E. K. Bloss, director of research and de-

velopment for the Boston & Maine Railroad, will deliver a special address at 9:45 a.m. Sept. 23.

Speakers and their topics at meeting sessions follow:

Sept. 21-10:30 a.m., Traction Motor Problems, Mr. C. P. Stendahl, diesel locomotive supervisor, Great Northern

Railway Co.; 2 p.m., (1) Cylinder Head Reclamation and (2) Lube Oil Cooler & Radiator Reclamation, Mr. L. H. Booth, general master mechanic, Chesapeake & Ohio Railway; 3:30 p.m., Selection, Handling & Policing Economy Fuels; Their Effect on Locomotive Maintenance & Operation, Mr. C. A. Wilson, assistant general superintendent diesel equipment, Atchison, Topeka & Santa Fe Railway.

Sept. 22-8:30 a.m., Steam Generator Operation and Maintenance, Mr. J. H. Hastings, general boiler inspector, Canadian Pacific Railway; 9:45 a.m., (1) Advances in Wheel Shop Equipment and Practices and (2) Equipment for Economical Fuel Injection Testing and Repair, Mr. G. M. Beischer, chief mechanical officer, the Western Maryland Railway.

Sept. 23-8:30 a.m., (1) Maintenance of Air Compressors and Appurtenances and (2) Exhaust Manifold Maintenance, Mr. E. Milkert, assistant to superintendent, motive power, Alton & Southern Railway; 10:15 a.m., Power Assemblies—Maintenance and Developments, Mr. K. Pruchnicki, supervisor, locomotive maintenance, Texas & New Orleans Railroad; 2 p.m., New Ways and Means to Improve Motive Power Maintenance and Reduce Costs, Mr. C. P. Turner, system supervisor, diesel operation and maintenance, Lehigh Valley Railroad.

The entire afternoon Sept. 22 has been reserved for a review of the Allied Railway Supply Assn., Inc., exhibit.

## Snow-Nabstedt Distributor

Snow-Nabstedt Gear Corp., New Haven, Conn., has appointed a new distributor for eastern Canada, Russel-Hipwell Engines Ltd. Stocks of gears and service parts have been placed at various branches of Russel-Hipwell Engines, including Toronto, Montreal, Halifax, St. John's, Port Arthur, Seven Islands and Owen Sound, head office of the company. Russel-Hipwell also distributes Cummins diesel engines and Lister diesel engines and manufactures a line of products under the trade name Steelcraft. These include many vessels.

## Engineering Controls, Inc., Names New Distributor

Engineering Controls, Inc., St. Louis, Mo., has appointed Central Equipment Co., Chicago, Ill., as its sales representative to the railway industry. Engineering Controls, Inc., is the developer and manufacturer of vapor phase thermal circulation engine cooling systems, which utilize the natural law of boiling water to maintain uniform operating temperatures throughout diesel engines.

NOW YOU CAN STANDARDIZE WITH THE

# all purpose power line

(20 TO 1650 H.P. IN ONLY 3 CYLINDER SIZES)

...and get all the benefits of GM Diesel standardization in every type and size of boat



Standardization with GM Diesel engines pays off big because fast-stepping 2-cycle "Jimmy" Diesels get work done faster—whether used for propulsion, pumping, hoisting or other auxiliary use.



GM Diesel covers the power range—20 to 1650 H.P. with only 3 cylinder sizes—compared to the 5 to 10 cylinder sizes which other Diesel manufacturers use.



Operators who standardize on GM Diesel power need stock, in most cases, only 1 size or, at most, only 3 sizes of wearing parts—maintain full protection with the smallest investment in spares.



**GM  
DIESEL**

PARTS AND  
SERVICE  
WORLDWIDE

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario.

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 26, MICH.

## EMD Announces Promotions

A series of organizational and personnel changes has been announced by Electro-Motive Division of General Motors, La Grange, Ill. The appointments reflect the expanding activity of Electro-Motive in the electric utility field, General Sales Manager Mr. V. E. Rennix said. In the Eastern region, Mr. R. B. Johnstone, former regional sales engineer, has been promoted to manager of utility equipment sales. Mr. J. P. Greenip, former regional sales engineer in the St. Louis region, has been transferred and promoted to district manager—utility district. In addition, Messrs. J. G. Cronin and M. C. Warren, former district sales managers, are now district managers—utility district. In the Chicago region, Mr. F. E. Von Ohlen, former district sales manager, has been promoted to manager of utility equipment sales. Mr. H. E. Mann, former regional sales engineer, and Mr. D. R. Eichler, former industrial sales engineer, have been promoted to district managers—utility district. In the St. Louis region, Mr. G. C. Mulick, former export sales engineer, and Mr. A. M. Hazell, Jr., petroleum sales engineer, have been appointed district managers—utility district.

## New Assignments Made By Delco-Remy Division

Three major new assignments for key executives of Delco-Remy Division, General Motors Corp., were announced recently by General Manager Donald L. Boyes. Mr. J. H. Bolles was named to a newly created post as divisional director of product reliability. He had been director of sales and engineering for five years. Succeeding Bolles as director of sales and engineering is Mr. H. G. Riggs, divisional works manager since 1954. Mr. Robert L. Kessler, former manufacturing manager for starting, lighting and ignition equipment, will succeed Riggs as works manager.

## First Hercules Distributor in Yukon Territory

Appointment of Hercules Motors Corporation's first master distributor in Canada's Yukon Territory has been announced by William L. Pringle, president. Ed Jacobs Motors, Whitehorse, will handle and service Hercules' complete line—including air-cooled and liquid-cooled gasoline, diesel and LPG (liquefied petroleum gas) engines and power units ranging from 5 to 600 horsepower. The new distributor was selected primarily for two reasons, Mr. Pringle said: (1) strategic location on the Alcan Highway, (2) adequate experience, training and facilities for servicing trucks making the Alcan run. The new distributor is located approximately halfway

between two Hercules dealers along the Alcan—one in Dawson Creek, B.C., the other at Anchorage, Alaska—and will complement the activities of both.

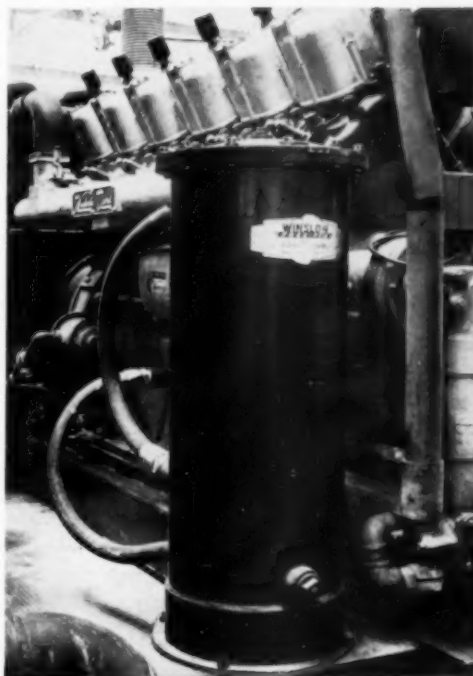
## Finned-Tube Heat Exchanger

Features and performance characteristics of its longitudinal finned-tube heat exchangers and thermal heaters are de-

scribed in a new bulletin available from Alco Products, Inc. According to Alco, the exchangers offer high heat-transfer rate and fluid flow at low cost, together with interchangeability within a plant and "off-the-shelf" availability. The 12-page, two-color publication contains details on the company's range of finned-tube equipment for process applications, and includes isometric cut-aways and

exploded views of complete units and both regular and high-pressure closures. Sections of the bulletin are devoted to dimensions, mechanical specifications, physical data of steel and non-ferrous heat exchangers, and finside coefficient and finside pressure drop, for Alco heat exchangers. Copies of the publication are available by writing Alco Products, Inc., P.O. Box 1065, Schenectady, N.Y.

# WAUKESHA's long use of WINSLOW

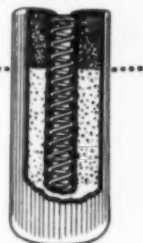


Winslow CP\* Filters on Waukesha V-12 800 hp Diesel

## TWO filters in ONE!

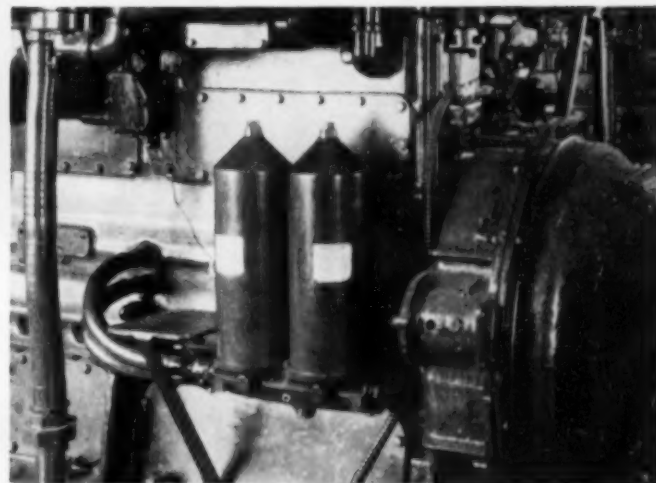
TWO materials—Fine and Superfine—in each Winslow CP\* element continuously self-adjust pressure, give TRUE full-flow of filtered oil—without incurring excessive back pressures.

\*Controlled Pressure. Patented, U.S. and foreign patents.



## CP\* full-flow oil filters has resulted in virtually eliminating shaft and bearing problems!

You can do the same with Winslow on your engines! Specify Winslow CP\*—Controlled Pressure—full-flow filters for long engine life!



Waukesha gas engine type 6-NRK with Winslow Filters

There's a Winslow CP\* element to fit your filter—any standard type, gasoline or diesel, fuel or lube oil. Switch to Winslow for long engine life!

Write for: "The Stirring Saga of Big Drip and Little Drip!" and their capture by the Winslow Boys!



# WINSLOW

ENGINEERING & MANUFACTURING COMPANY  
4069 Hollis Street, Oakland, California, OLympic 2-0288



## Inland River Reports

By A. D. Burroughs

WHAT reportedly will be the first push-style riverboat ever built specifically for Hudson River duty is scheduled for construction at Dravo Corp., Pittsburgh. Ordered as the first in a series of three by Cornell Co., New York City, the 105

x 30 ft. towboat will have 1800 hp from two Fairbanks-Morse engines.

SERVING the section from Pittsburgh to New Orleans is the new *Northern*, 148 x 34 ft. towboat owned by Union Barge Lines. Built by Dravo in its 3200-series, the *Northern* has 3200 hp developed from two GM Cleveland diesel engines.

TWIN-SHIP to the *Northern* is the new 3200 hp towboat ordered from Dravo by Berwick Bay Towing Co., affiliate of Chotin Transportation Co., New Orleans. This unnamed towboat will be active in the petroleum trade on the Mississippi, Ohio and Monongahela Rivers with push power supplied from two GM Cleveland engines.

THE new towboat for a new company, Mid-South Towing Co., Tampa, Fla., will carry the name, *Girley Knight*. The 156 x 35 ft. vessel, under construction at St. Louis Shipbuilding and Steel Corp., will have 3200 hp from two Fairbanks-Morse OP engines rated at 1600 hp each.

HAZEL, the new 90 x 24 ft. towboat completed by Nashville Bridge Co., Nashville, Tenn., for Crounse Corp., Paducah, Ky., rates considerable interest because of the Wichita marine clutch installation. Two Caterpillar D-311 generators supply auxiliary power. Model 12-567ATL GM Cleveland engines provide the rated 900 hp.

CUMMINS Missouri Diesel Sales Corp., St. Louis, supplied two Cummins NR-TO-6-M engines for the new 440 hp twin-screw towboat, *Jeanne B*. The 50 x 10 ft. vessel, completed by Missouri Dry Dock and Repair Co., Cape Girardeau, Mo., is working for Southern Illinois Sand Co., Chester, Ill.

TWO identical sister craft, the *Pawnee* and the *Sioux*, are in service for Western Contracting Corp., Sioux City, Iowa. The 65 x 22 ft. vessels were delivered by Missouri Valley Steel, Inc., with 1000 hp developed from two GM Cleveland engines, model 8-268-A.

THE busy *Beaver*, popular Union Barge Lines boat built in 1937 by Dravo, has a new look after repainting and remodeling and a new life with a new 450 hp Fairbanks-Morse engine.

SEMARCA 22 and *Semarca 23*, two launches ordered by George Engine Co., New Orleans have been delivered by Sewart Seacraft, Inc., Berwick, La. Both vessels will see duty in South America for Tidewater Marine Service. Both are equipped with a matched pair of engines for the rated 27 mph.

DURING recent fishing excursions, we spotted the beautiful *Crescent City* making fast time upriver near Owensboro, Ky. Retaining all the sparkle of a new towboat, the 148 x 34 ft. towboat has 3200 hp in performance for Sioux City and New Orleans Barge Lines from two GM engines.

THE big boats were in business with the big 6000 hp towboat, the *Theresa*

*Seley*, in operation for Seley Power, Inc., New York. The 200 ft. craft has its power supplied from two Nordberg Supairthermal engines.

KING of its kind, the *United States*, was sighted at work for Federal Barge Lines. This 1958 edition from St. Louis Ship has a power rating of 8500 hp from four Cooper-Bessemer engines.

THE *Hamilton* was spotted making a good performance with the rated 2560 hp from a pair of Enterprise engines. Built for Illinois Waterway service in 1957 by St. Louis Ship, the 128 x 35 ft. towboat is one of the most powerful plying those waters.

### Centrico Establishes Western Division

According to an announcement made by O. Mueller-Habig, president of Centrico, Inc., Englewood, N. J., a new Western Division of the Company is being established to handle distribution of Westfalia centrifugal separators throughout the eleven western states. Named as Manager of the Western Division is August E. Peitzmann, who will make his headquarters at 3315 Caxton Court, San Mateo, Calif. Mr. Peitzmann has had seven years of experience as a sales engineer and technical specialist on all types of Westfalia separators, and in all market areas—including marine, and general industrial. During this time, he has been operating out of Centrico headquarters at Englewood, N. J. Prior to this, he had an equal amount of experience at the main Westfalia separator plant in Oelde, Western Germany.

### Engine-Driven Synchronous Generator Bulletin Released

Construction features of Allis-Chalmers engine-driven synchronous generators are described in a new bulletin released by the company. Field coils for most ratings of the synchronous generators are of wire-wound integrated construction. This insulation system locks the coil structure securely and permanently to the pole, provides exceptional dimensional stability, strength and durability against centrifugal stress and vibration, and is unaffected by moisture, oil or chemicals. The engine-driven synchronous generators are available in all standard ratings, at speeds from 150 to 600 rpm, and with limitations due to rotor construction, from 720 to 1200 rpm. The bulletin also carries information on self-contained, direct-connected generators and on belted exciters for use with engine-type generators. Copies of Engine-Driven Synchronous Generators, 05B6139B, are available on request from Allis-Chalmers, Milwaukee 1, Wis.

ITS NEW



## NUGENT DUPLEX FILTER keeps all the lube oil clean for this Gas Turbine

The 7000 HP General Electric gas turbine shown above is destined for service in an East Texas chemical plant. A Nugent 1555BF-4L4 Duplex Filter is an integral part of the turbine system. Each filter comprising the duplex has a capacity of 150 GPM of 125 SSU viscosity lubricating oil. All the oil in circulation is filtered every cycle before going to the bearings. Foreign solids as small as 5 to 10 microns are removed; thus, harmful impurities cannot reach vital parts to accelerate wear.

Nugent Filters can lengthen the service life of your valuable equipment . . . reduce downtime . . . cut maintenance costs. Let us show you how. Write for information today.



REPRESENTATIVES IN  
PRINCIPAL CITIES

**WM. W. NUGENT & CO., INC.**

3441 CLEVELAND STREET, SKOKIE, ILLINOIS

OIL FILTERS • STRAINERS • TELESCOPIC OILERS  
OILING AND FILTERING SYSTEMS • OILING DEVICES  
SIGHT FEED VALVES • FLOW INDICATORS

## Rockwell-Standard Corp. Acquires Air-Maze Corp.

Air-Maze Corp., Cleveland, Ohio, which manufactures industrial liquid and gas filters, was acquired June 30 by Rockwell-Standard Corp., Coraopolis, Pa. The acquisition involved an exchange of more than 100,000 unissued shares of Rockwell-Standard for all Air-Maze outstanding stock. Rockwell-Standard manufactures components for the road building machinery, automobile and farm equipment fields. Air-Maze was founded in 1925. Its line includes permanent cleanable air filters, electronic aid filters, oil bath and oil wetted engine and compressor intake filters, air intake silencers, exhaust spark arrestors and backfire flame arrestors. Air-Maze is expected to become a Rockwell-Standard subsidiary.

## Robert Bosch Launches Nozzle Sales Campaign

The Robert Bosch Corp., Long Island City, N.Y., and San Francisco, Calif., has announced an injection nozzle program for dealers. Increased original equipment use of Robert Bosch injection units by engine manufacturers has emphasized the need for dealers to have stocks and information. Robert Bosch has developed an injection nozzle kit for dealers consisting of: a catalog with a simulated leather binder that has pages covering applications, cross-references, service tool information, service instructions, information and prices; a sign, "Fuel Injection Equipment"; and a cabinet to hold and protect nozzles and other parts. This free kit is available with the purchase of a small stock selected by the dealer to fit his particular needs.

## Taliaferro President of Sunray

Mr. Paul E. Taliaferro was elected president and chief executive officer of Sunray Mid-Continent Oil Co. by the company's board of directors at their recent quarterly meeting. Mr. Taliaferro succeeds W. C. Whaley who has been president of the company for the past seven years and who on May 1 became eligible for retirement. Whaley will remain with Sunray, however, and was re-elected an officer as chairman of the executive committee. Mr. C. H. Wright was re-elected chairman, and R. W. McDowell, president of DX Sunray Oil Co., wholly owned subsidiary, was re-elected vice-chairman. The new president of Sunray Mid-Continent has served the company as executive vice-president since 1952, and previous to that served as general attorney, and vice-president assistant to the president.

## Wood Named District Manager


Mr. Charles D. Wood of Worthington Corporation's Boston District Office has been appointed District Office Manager at Boston, effective May 1, succeeding Richard M. Cleveland who will retire on June 30. The announcement was made recently by A. W. Fraser, general marketing manager. Mr. Wood is a

graduate of the University of Tennessee with a degree in Mechanical Engineering. He joined Worthington at Boston in 1939 as an application engineer. Following service with the U. S. Navy during World War II, attaining the rank of Lieutenant Commander, he returned to the Boston Office, serving as Application and Field Service Engineer and Technical Representative.

**NEW AND NOW AVAILABLE!** The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. LaCienega Blvd., Los Angeles 46, Calif.

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## WAUKESHA DEFENDER

Turbocharged MARINE DIESELS



Her beat is 700 miles of California coast line. Said to be the largest fisheries patrol vessel in the U.S., the recently launched "Albacore" is 90 ft. long; beam, 22-ft.; draft, 6-ft. 9-in.; 137 gross tons. Cruising speed is 15 knots. Her twin in-line six-cylinder Waukesha Defender Turbocharged Diesel Engines—8½ x 8½-in., 2894 cu. in., 510 max. hp. at 1215 rpm for 24-hour duty—drive stainless steel propellers through 2.19-to-1 Snow-Nabstedt reverse and reduction gears. "Albacore" is skippered by Capt. Ralph Dale. Chief Engineer is J. W. West. She carries a 6-man crew including the skipper. Send for Bulletin 1721.

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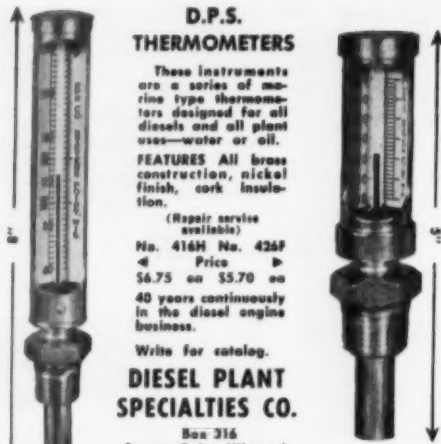
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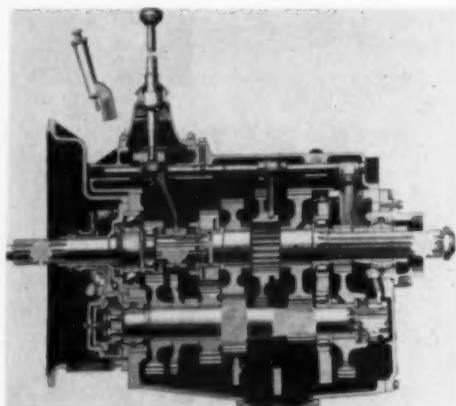


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### New Fuller Transmission

A new, heavy-duty transmission for off-highway service has been announced by the Fuller Mfg. Co. Designated as the model 5-G-1220, the five-speed, high-capacity transmission is engineered for operation in big earthmoving, logging, mining and quarrying equipment, including prime movers



pulling scrapers of 12 to 14 cu. yd. capacity. The new transmission also is designed for off-highway service in trucks equipped with engines of equivalent torque and horsepower. The 5-G-1220 offers higher capacity than other models in Fuller's 1220 Series because axial thrust has been eliminated by use of spur gearing throughout the unit. Standard equipment on the new transmission includes the Fuller pressure lubrication and filtration systems and countershaft inertia brake. The

pressure lubrication and filtration systems provide positive lubrication of the mainshaft pilot bearing and mainshaft gear bushings, keep the gear oil clean between changes and prolong gear and bearing life. The air-powered countershaft brake, activated simply by pushing a pre-select button, permits upshifts without double clutching. The 5-G-1220 is available with overdrive gear ratios of either .636 or .744. It weighs 752 lbs., is 31 $\frac{7}{8}$  in. long.

### DeLong Joins DIESEL PROGRESS As New Associate Editor

Appointment of John C. (Jack) DeLong as associate editor of DIESEL PROGRESS is announced by Rex W. Wadman, editor and publisher. DeLong joined the staff on June 1 after a four-year association with Bucyrus-Erie Co., South Milwaukee, Wis. His most recent position was as copy chief-outside publicity and prior to that he was for three years associate editor of Excavating



Jack DeLong

Engineer, a national trade journal published by Bucyrus-Erie. In this position he traveled extensively in the eastern half of the United States and Canada and has gained an excellent background in the application of diesel driven equipment used in construction, mining and quarrying. A native of Canton, Ohio, DeLong is a graduate of the School of Journalism, Marquette University. Prior to joining Bucyrus-Erie, he was associated with three newspapers, The Canton Repository, Milwaukee Journal and the Waukesha (Wis.) Freeman.

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**1. ENGINES** — All major manufacturers of diesel, dual fuel, natural gas engines and gas turbines are represented in multiple page sections. Text is supplemented with specifications, power curves, photographs and sectional views.

**2. TURBOCHARGERS and SUPERCHARGERS** — This section of manufacturers is detailed and fully illustrated to give complete information on this increasingly important phase of the industry.

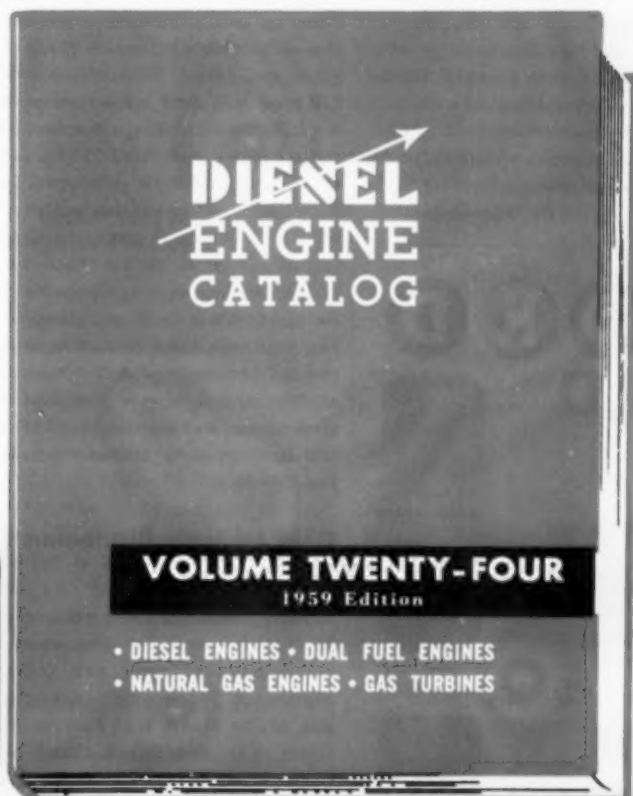
**3. TRANSMISSIONS** — The latest information on torque converters, fluid drives, and other modern means of transmitting power are fully described and illustrated in this section.

**4. ACCESSORY EQUIPMENT** — Recent developments in fuel injection systems, governors, and other key accessory units are detailed and illustrated fully in this section.

**5. MARKET PLACE** — A convenient, time-saving listing of sources from which you can obtain the multitude of items and services needed by the fast growing Diesel Industry.

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## Filter Element Engineering Kit

A filter element engineering kit for design engineers is now available by writing on company letterhead to Bendix Filter Division, Bendix Aviation Corp., 434 W. 12 Mile Rd., Madison Heights, Mich. The kit consists of an assortment of five, 1-in. long Bendix Microbon, ribbon-type filter elements that can be installed for performance testing and evaluation in equipment where air, water, gasoline, oil and other liquids require low-cost, high flow-rate, high efficiency filtration. These filter elements are self-supporting cylinders of high mechanical strength that are made from helically-wound ribbons of phenolic resin-impregnated cellulose, electrically polymerized and fused together. Orifices between the ribbons permit free fluid flow while impurities are retained by edge filtration either on the outside or inside of the cylindrical element, depending on the chosen flow direction. The elements can be quickly and thoroughly cleaned by

either reversing fluid flow or by a reverse flow of previously filtered compressed air. They are recommended for filtering applications in oil refineries, engines, aircraft, automobiles and trucks, hydraulic machinery, air compressors, fuel and oil service trucks and manufacturing plants. The kit elements have diameters of  $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ , 2 and  $2\frac{1}{2}$  inches. Bendix Microbon filter elements are supplied commercially in any desired length in a range of diameters from  $\frac{1}{8}$  to 6-inches.

ITS NEW

## Hamilton Gets Order for Navy Equipment

A \$2,098,911 contract for diesel generating equipment was let recently to power a United States Naval radio station—believed to be the most powerful in the world—for communication with submerged and surface vessels in the Atlantic area. The contract was awarded by the Continental Electronics Mfg. Co., Dallas, Texas, to the Hamilton Divi-

sion, Hamilton, Ohio, of Baldwin-Lima-Hamilton Corp. The contract includes engines, generators and complete auxiliaries for the Navy's very-low-frequency transmitting station now under construction. A master shore station, it will be located at the easternmost point of the United States, near Cutler, Me.

Twice as powerful as any other U. S. Navy station, the facility will supplement the world-wide naval communications system. Propagation of the low-frequency signal will be provided by twin antenna arrays, each shaped in the form of a six-pointed star. Distance between extreme points of the two arrays will be more than two miles. Hamilton Division's contract calls for six engines of two sizes. Four of these, 8-cylinder engines, each rated 3870 horsepower at 257 rpm, will drive generators producing 2750 kw each. The other two, 6-cylinder engines, each rated 715 hp at 600 rpm, will drive 500-kw generators. Total horsepower for all engines will be 16,910. Total electrical output of all generators will be 12,000 kw. Total weight of the diesel generating equipment will be approximately 2 million pounds. Shipment, scheduled to start in September and be completed in December, will require 30 freight cars. Completion of construction and installation of all general facilities at the station is scheduled for July 1960.

marine engines and the service of Allison transmissions. He was formerly parts manager. Mr. P. G. Brewer, formerly supervising locomotive sales engineering activities, has been appointed parts manager. Succeeding Brewer is L. S. Murray. Formerly liaison engineer in the engineering department, Murray was responsible for co-ordinating engineering work with the requirements of the Sales Department.

## Clark Bros. Announces New Sales Appointments

Appointment of Mr. Ernest G. Hotze as southwest district manager for Clark Bros. Co., one of the Dresser Industries, has been announced by Mr. George W. Probst, Clark vice president—sales. Hotze will be responsible for the sale of Clark engines, compressors and gas turbines throughout Texas (except the Panhandle area), Mississippi, Louisiana, southern Arkansas and southern New Mexico. Hotze has been with the Clark organization since 1942. Mr. Joe Y. Allen, Jr., former assistant district manager, succeeds Hotze as Houston district manager. Also named district manager under Hotze is Mr. James R. Hutton, who will be in charge of the newly created Louisiana-Mississippi District serving southern Arkansas, Louisiana and Mississippi.

## W. A. Roach Promoted to Product Manager

J. E. Lonergan Co., Philadelphia, has appointed William A. Roach, Jr. as Product Manager. Announcement of Roach's appointment was made by Mr. Ronald V. Smith, vice-president of the 87-year-old valve manufacturing firm which markets safety valves, relief valves, and pressure gauges to the power, process, and mechanical industries. Mr. Roach has been with Lonergan eighteen years, having started as apprentice draftsman back in 1941. During the years he has served successively as draftsman and chief draftsman.

## Ramsey Names Siverts General Sales Manager

Mr. Hans Siverts has been appointed General Sales Manager of Ramsey Corp., St. Louis, Mo., according to an announcement made by corporation president Bill Mahoney. To Siverts' responsibilities as sales manager of the Replacement Piston Ring Division are now added those of sales manager of the Original Equipment Division and the Retaining Ring Division, according to the announcement. Mr. Siverts came to Ramsey in 1957, from American Brake-blok Div., Detroit, where he started as sales representative in 1948. He was appointed manager of the Replacement Division in 1952.

## Eight Aeroquip Distributors Named

Aeroquip manager of distributor sales, M. Lloyd Jones, has announced the appointment of eight new industrial distributors for Aeroquip Corp., Jackson, Mich.: Shako, Inc., Latham Traffic Circle, P.O. Box 966, Latham, N. Y.; Carter Engine & Equipment Co., 633 Walnut, Box 463, Abilene, Tex.; Southern Equipment Co., P.O. Box 946, El Dorado, Ark.; Industrial Equipment Corp., 330 N. Kansas Ave., Springfield, Mo.; Dick Adams, Inc., P.O. Box 960, Aiken, S. C.; Uebler's, Vernon, N. Y.; Sterling Supply Corp., 1-35 Porter St., Philadelphia 48, Pa.; Derkin & Wise, Inc., 356 Morris St., Toledo, Ohio.

## Administrative Changes at General Motors Diesel Ltd.

Four administrative promotions within the sales department of General Motors Diesel Ltd., London, Ontario, have been announced by General Sales Manager, W. M. Warner. Mr. Russell Gage, formerly manager of G.M. diesel engine sales, has been appointed to the newly-created position of assistant to the general sales manager. Mr. H. F. Shepherd has been appointed manager of G.M. diesel engine sales, responsible for the sales and service of G.M. diesel industrial and

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Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

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# CLUTCHES

## Pre-Heaters for Heavy Fuel Oil

A complete line of heavy fuel oil electric preheaters, with thermostatic regulation of temperature, is announced by Vulcan Electric Co. The new line includes low density tail piece heaters, suction or return line heaters and circulation heaters in a wide range of models, wattage and voltage ratings. Vulcan tail piece heaters are made with either 2 in. NPT screw mountings or 4 in. bolt circle flanges. 1, 2, 3 and 5 kw units are available with dual control or single control thermostats. Temperature is controlled to plus or minus 5° F. Optional automatic wattage output drop on low fire or standby may be included. Units are interchangeable with standard types now in use. Larger models are available up to 36 kw, 208 to 550 volts, single or three phase, 3, 5 or 6 in. pipe flanges, with or without built-in thermostat. These may be ordered completely assembled in insulated shell and jacket, equipped with 2 in. inlet and outlet mounting brackets, ready for installation. For technical literature and prices, write to Vulcan Electric Co., 88 Holten St. Danvers, Mass.

## In-Stock Plan Announced by Hose Manufacturer

Important savings of time and money are the economies effected by the new in-stock plan just introduced by Allied Metal Hose Co. for its line of standard MNH flexible metal hose connectors. Users have a wide range of "off-the-shelf" stock connectors to choose from. Available in stainless steel, bronze and monel, the new Allflex MNH flexible connectors master pipeline problems caused by rigid connections. They dampen vibration, permit offset motion and travel, compensate for misalignment, absorb pipeline expansion, and handle all required flexing and movement applications. The new flexible connectors are stocked by local industrial distributors, or by same day shipment from the factory. Full specifications, application information and helpful engineering data sheets are available from Allied Metal Hose Co., 3774 Ninth St., Long Island City 1, N. Y.

(ITS NEW)

## Baer Will Assist Perfect Circle President

Appointment of Mr. G. Robert Baer as assistant general manager has been announced by Perfect Circle Corp., Hagerstown, Ind. Baer will retain his duties as general manufacturing manager. In making the announcement, President W. B. Prosser said that Perfect Circle's increased foreign activities and domestic business had made necessary closer coordination between manufacturing activities and the work of the company's

other divisions. Baer will assist Prosser in providing this coordination. Baer has been with Perfect Circle since 1942. He was named general manufacturing manager in August 1957.

## 300 KW Turbine Generator Set

Solar Aircraft Co. has announced a new commercial gas turbine-powered 300 kw generator set which Texas Eastern Gas Transmission Corp. will soon install in a natural gas pipeline compressor station. The new unit weighs 7600 lbs. and is 13 ft. long by 5 ft. wide by 5 ft. high. The Solar unit is powered by a 500 hp Jupiter gas turbine engine which will run on natural gas in this application. The generator set will be used to provide electricity in a Texas Eastern pipeline station. The Solar Jupiter engine is also currently in use powering fast offshore crewboats for the oil industry.

(ITS NEW)

## Morse Chain Will Open Los Angeles Factory Branch

Morse Chain Co., a Borg-Warner industry, announces that it will open a factory branch and warehouse in Los Angeles at 5071 Telegraph Rd. Coincidental with this, Mr. H. A. Hallet has been appointed as district manager for the Los Angeles area. Hallet previously was with Morse Chain Co. for nine years in Chicago. On the West Coast, he had been associated with the Edward D. Maltby Co. in Los Angeles and, most recently, with Marman Division of the Aeroquip Corp. as director of power transmission sales.

## Chain Lubrication Brochure

A new Sun bulletin, Lubrication of Roller and Silent Chain Drives, covers principles of lubrication, maintenance, and oil selection. Oil selection charts are included. Bulletins are available from Sun Oil Co., Industrial Products Department, 1608 Walnut St., Philadelphia 3, Pa.

(ITS NEW)

## Engine Log Book Announced

Owners of diesel engines will be interested in a new book published by Engine Division, Caterpillar Tractor Co. This Engine Log Book covers thirteen months of operation and contains space for daily entries on fuel and lube oil consumption, parts, service, repairs, etc. Monthly entries may be transferred to a twelve month summary sheet and a post card is enclosed with which the operator can order a new book when the old one is used. This book is bound in smudge-proof covers. For your copy write to Engine Division, Caterpillar Tractor Co., Peoria, Ill. and specify Booklet No. 20167.

(ITS NEW)

## Magnesium Control Panel Boards

Panellit, Inc., 7401 No. Hamlin Ave., Skokie, Ill., offers a new line of light weight magnesium control room panel boards which are easy and safe to alter in the field. Besides their light weight, magnesium panels permit installation of additional instruments or other panel alterations in the field at low cost. Panels can be faced on one or both sides with  $\frac{1}{8}$  in. sheet Formica or Mylar.

## Booklet on Tables and Formulas Available

A new booklet, Convenient Tables and Formulas, has been published by Westinghouse Electric Corp. The book includes 120 pages of convenient tables, formulas, and graphical symbols summarizing electrical data, properties of materials, heat transfer, power factor correction, measurements, and other subjects. For a copy of booklet B-3677D,

write to Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. (ITS NEW)

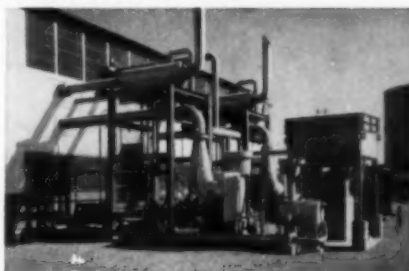
## Northwest Orders Turbo-Starters

Sixteen mobile Boeing Turbo-Starters have been ordered by Northwest Airlines as ground support for the airline's new jetliner fleet. The Northwest order, announced recently, also included one Boeing portable flyaway compressor, two spare turbine compressors, and four cart-mounted units. This brings the total announced orders for Boeing Turbo-Starters and turbine compressors to 71. The Turbo-Starters are small gas turbine compressors mounted in panel trucks. The compressors will provide rapid pneumatic starts for the large jet engines on Northwest's Lockheed Electra and Douglas DC-8 jetliners. Northwest will station Turbo-Starters at its major route stops and will airlift the lightweight flyaway compressor for emergency ground support.

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## GENERATORS ARE



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Photos courtesy of Southern California and Southern Counties Gas Companies



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## ADVERTISERS' INDEX

Allis Chalmers .....	8	Electro-Motive Division ....	Second Cover-1
American Bosch Division of American Bosch Arma Corp. ....	50-51	Harrison Radiator Division .....	2
American MARC, Inc. ....	53	Harrison Radiator Division, General Motors Corp. ....	2
American-Standard, Industrial Division .....	12	Ideal Electric & Mfg. Co., The .....	54
Amot Controls Corporation .....	60	Illinois Testing Laboratories, Inc. ....	47
Burgess-Manning Company .....	53	Interstate Diesel Service, Inc. ....	60
C. A. V. Ltd. ....	45	Koppers Company, Inc. ....	6
Chrysler Corporation Marine & Industrial Engine Div. ....	5	Maintenance Minder .....	53
Cities Service Oil Co. ....	16	Maxim Division, Emhart Manufacturing Co. ....	63
Cleveland Diesel Engine Div., General Motors Corp. ....	55	Minneapolis-Honeywell Regulator Co. ....	9
Cooper-Bessemer Corp. ....	Fourth Cover	Napier Engines, Inc. ....	7
Dana Corporation .....	4	National Metal & Steel Corp. ....	60
Delco-Remy Division, General Motors Corp. ....	14-15	Nugent & Co., Inc., Wm. W. ....	58
Detroit Diesel Engine Division, General Motors Corp. ....	56	Purolator Products, Inc. ....	13
Diesel Plant Specialties Co. ....	60	Rockford Clutch Division, Borg-Warner .....	62
Electro-Motive Div., General Motors Corp. ....	Second Cover-1	Standard Oil Co. of California .....	11
Emhart Manufacturing Co. Maxim Division .....	63	Standard Oil Co. (Indiana) ....	Third Cover
Garrett Corporation, The (AiResearch Industrial Div.) .....	43	Thomas Flexible Coupling Co. ....	64
General Motors Corp. Cleveland Diesel Engine Div. ....	55	Waukesha Motor Company .....	59
Delco-Remy Division .....	14-15	White Diesel Engine Div., The White Motor Company .....	10
Detroit Diesel Engine Division .....	56	Winslow Engineering & Mfg. Co. ....	57
		Yates-American Machine Co. ....	49
		Young Radiator Company .....	52

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*Garnett, Kansas Light Plant  
in 1938, selected  
Standard Oil  
diesel lubricant*

**Situation:** In 1938, when Garnett, Kansas put two diesel engines (one 600 hp and one 1000 hp) into service, plant management selected a Standard Oil diesel lubricant. In 1948, when a 1400 hp engine was added, the performance from the Standard lubricant caused management to make the same choice. In 1955, when a 2100 hp diesel fuel unit was placed in service, STANODIESEL Oil M was chosen.

**What has happened:** At the Garnett plant, stuck rings and dirty pistons are unknown. The 1400 hp unit was in service nine years before reringing. Overhauls are made only every five years. The top performance from STANODIESEL Oil M and the technical service provided by lubrication specialist, J. D. Jenkins, have made possible first rate, uninterrupted, low cost electric service.

**What you can do:** The Standard Oil salesman near you in any of the 15 Midwest or Rocky Mountain states has the full story about STANODIESEL Oil M, and how it will perform for you. Call him. Or write, **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

You expect more from  and you get it!

## *Quick facts about STANODIESEL Oil M*

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by the use of economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.

Garnett plant superintendent John Watkins (left) and Standard Oil's J. D. Jenkins inspect light plant's 2100 hp unit lubricated with STANODIESEL Oil M. Jake Jenkins knows what he's talking about when he advises customers on lubrication. He's been doing this work for 13 years. He has an engineering degree from Missouri School of Mines, and he has completed the Standard Oil Sales Engineering School





Frank L. Friedli, Manager En-Tronics Sales, The Cooper-Bessemer Corporation, reports on...

## How automation pays off at Nantucket

Nantucket Gas and Electric Company had a costly power plant problem caused by Nantucket's population variation from a normal 3500 to a summertime 15,000. Now, everything is under control with a fully automatic Cooper-Bessemer En-Tronics system.

Peak load on this resort island requires three Cooper-Bessemer engines driving generators totaling 2950 kw capacity. The background photo shows this installation.

The En-Tronics control system, shown in the other photo, makes possible unattended operation. It starts engines, puts them on the line when the load builds up, takes them off when not needed, maintains correct frequency at all times, and increases plant efficiency over manual control. It also improves plant reliability, sensing irregularities and taking corrective action quickly.

Mr. C. G. Snow, Vice President of the Nantucket utility says, "It is expected that cost of the En-Tronics installation will be paid off rapidly from savings."

Find out how this new automatic control can be applied to your advantage. Write for free copy of new Bulletin E-88.

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